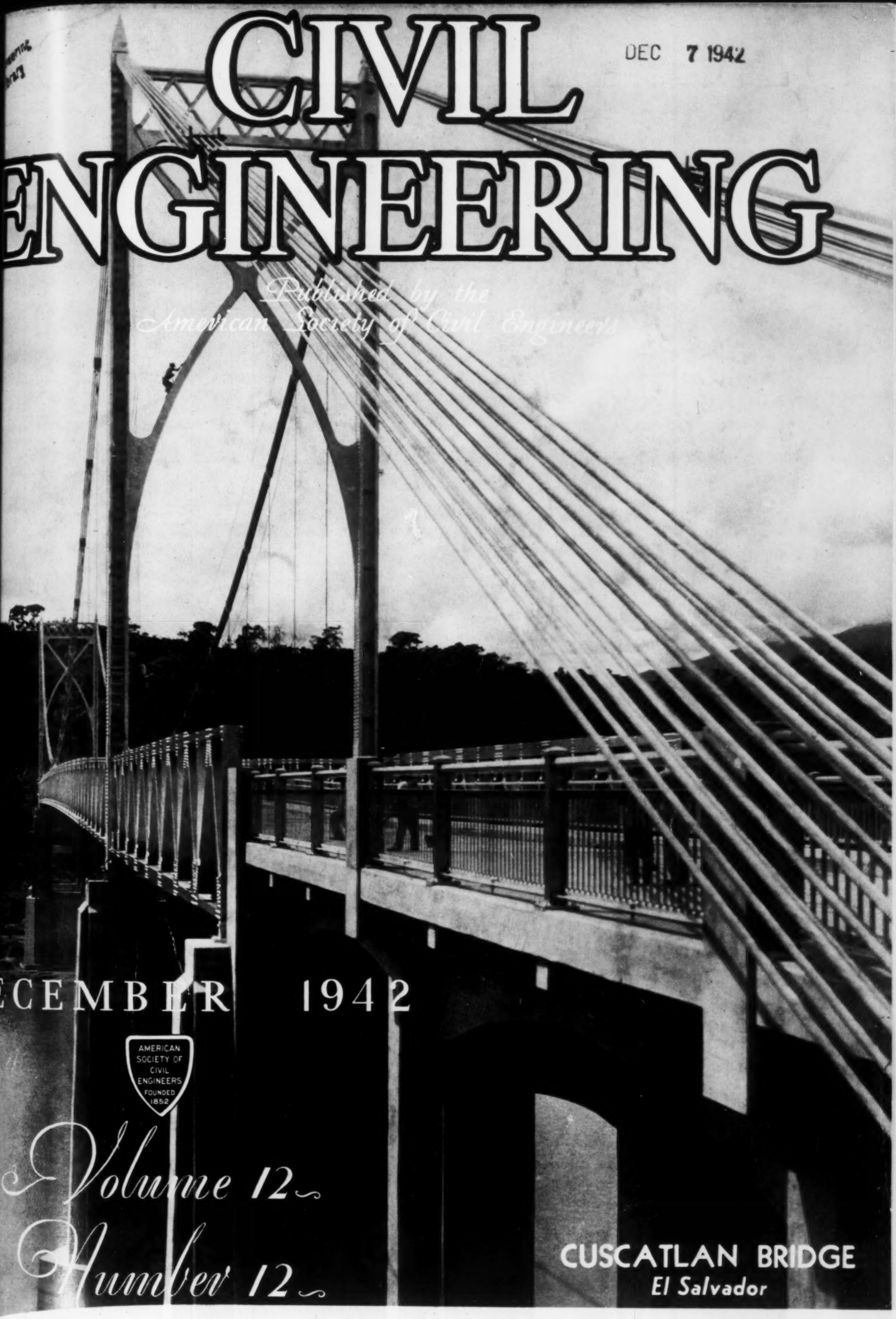
DEC 7 1942

CIVIL ENGINEERING

Published by the American Society of Civil Engineers



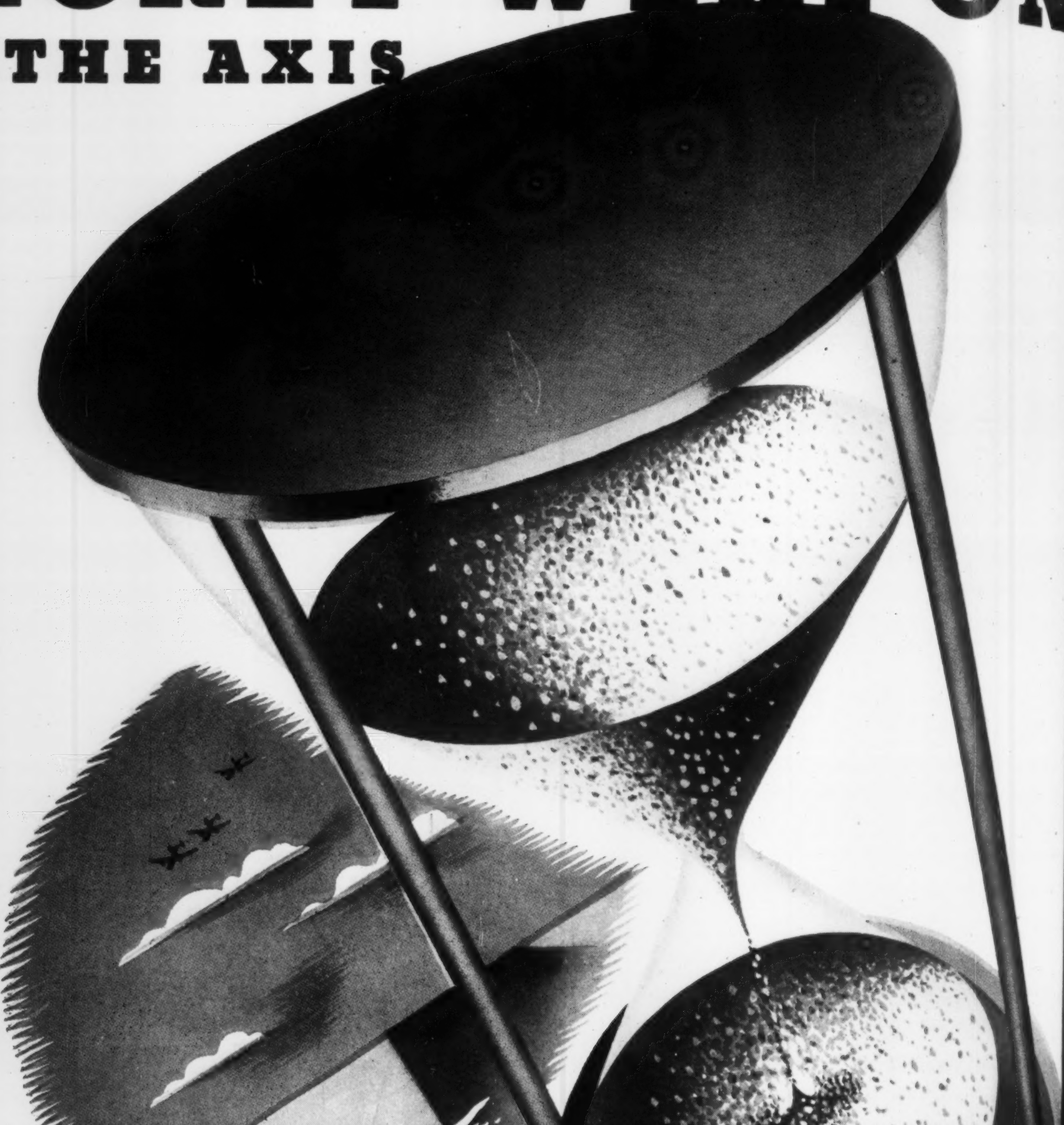
ECEMBER 1942

Volume 12

Number 12

CUSCATLAN BRIDGE
El Salvador

SECRET WEAPON
OF THE AXIS



Swifter than the Messerschmitt. More effective than the U-Boat. Deadlier than poison gas. TIME!

This is the weapon that has decided campaigns in France, Greece—on the Malay and Bataan peninsulas. And this is the instrument that can win the last battle.

Fortunately it is not too late to snatch this powerful weapon from enemy hands and wield it ourselves—on every front. We have the strength, we have the will—we must gather the momentum NOW!

To the victor will belong the centuries. But look in the hour glass—TIME is running out.

SCOPE OF RAYMOND'S ACTIVITIES
includes every recognized type of pile foundation—concrete, composite, precast, steel, pipe and wood. Also caissons, construction involving shore protection, ship building facilities, harbor and river improvements and borings for soil investigation.

RAYMOND CONCRETE PILE COMPANY
140 CEDAR STREET • NEW YORK, N. Y.
Branch Offices in Principal Cities

SEGREGATED
Scrap...
is your link to VICTORY!
18-8

Scrap salvage is a vital factor in the war effort. To be fully effective a scrap program must include methods for segregating and conserving critical alloying elements so urgently needed in the construction of tanks, guns, ships and planes.

Ferrous and non-ferrous metal scrap should be collected in separate containers at the machine where they are generated. Each class of high-speed tool steel and each type of constructional alloy steel should likewise be kept separate so that the alloy content can be returned to service.

Remember, — alloy scrap which is segregated, classified and labeled according to type and composition is a vitally important commodity today—and urgently needed to augment primary supplies of Nickel, molybdenum, tungsten, etc.

The metallurgical experience of our technical staff is available to aid you in these and other phases of metal salvage.

KEEP SCRAP MOVING INTO WAR PRODUCTION!

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET
NEW YORK, N. Y.

CIVIL ENGINEERING, December 1942. Vol. 12, No. 12. Published monthly by the American Society of Civil Engineers. Publication office at 20th and Northampton Sts., Easton, Pa. Editorial and advertising departments at the headquarters [illegible]
to members of [illegible]
of A[illegible]

140 CEDAR STREET • NEW YORK, N. Y. *Branch Offices in Principal Cities*

DEFY ERASURE-GHOSTS
with this new tracing cloth

Here is a tracing cloth that holds erasure scars at a minimum—that won't show water marks or perspiration stains. Now you can have clean tracings, in pencil or ink, free from these untidy "ghosts" that reproduce on blueprints!

For PHOENIX is ghost-proofed by a remarkable new process that defies moisture and gives you an unusually durable working surface. You can use harder pencils with this improved cloth and get sharper lines with less tendency to smudge. Even 6H lines show clearly, and reproduce sharply! Erasing does not mar the drawing surface; erased areas take pencil smoothly—and ink without feathering. Its new white color and increased transparency give you excellent drawing contrast and produce strong blueprints.

Let PHOENIX prove its virtues on your own drawing board. See your K&E dealer, or write for a generous working sample and an illustrated brochure.

EST. 1867
KEUFFEL & ESSER CO.
NEW YORK · HOBOKEN, N. J.
CHICAGO · ST. LOUIS · SAN FRANCISCO · LOS ANGELES · DETROIT · MONTREAL

PHOENIX DEFIES MOISTURE GHOSTS

Perspiration and water splashes on ordinary tracing cloth create "ghosts" which reproduce on blueprints. PHOENIX Tracing Cloth withstands actual immersion in water for fully 10 minutes at a time! *Perspiration and water marks will not stain it!*

PHOENIX LESSENS SMUDGE GHOSTS

The new improved surface of PHOENIX Tracing Cloth permits you to use harder pencils (5H and 6H) and to get sharper lines with less tendency to smudge.

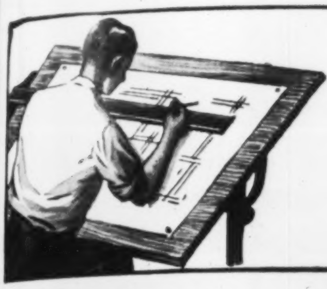
Result: Cleaner tracings and blueprints.

PHOENIX REDUCES ERASURE GHOSTS

Ordinary tracing cloths become scarred when erased... erased spots produce ghosts on blueprints.

PHOENIX has a durable drawing surface that reduces working scars to a minimum.

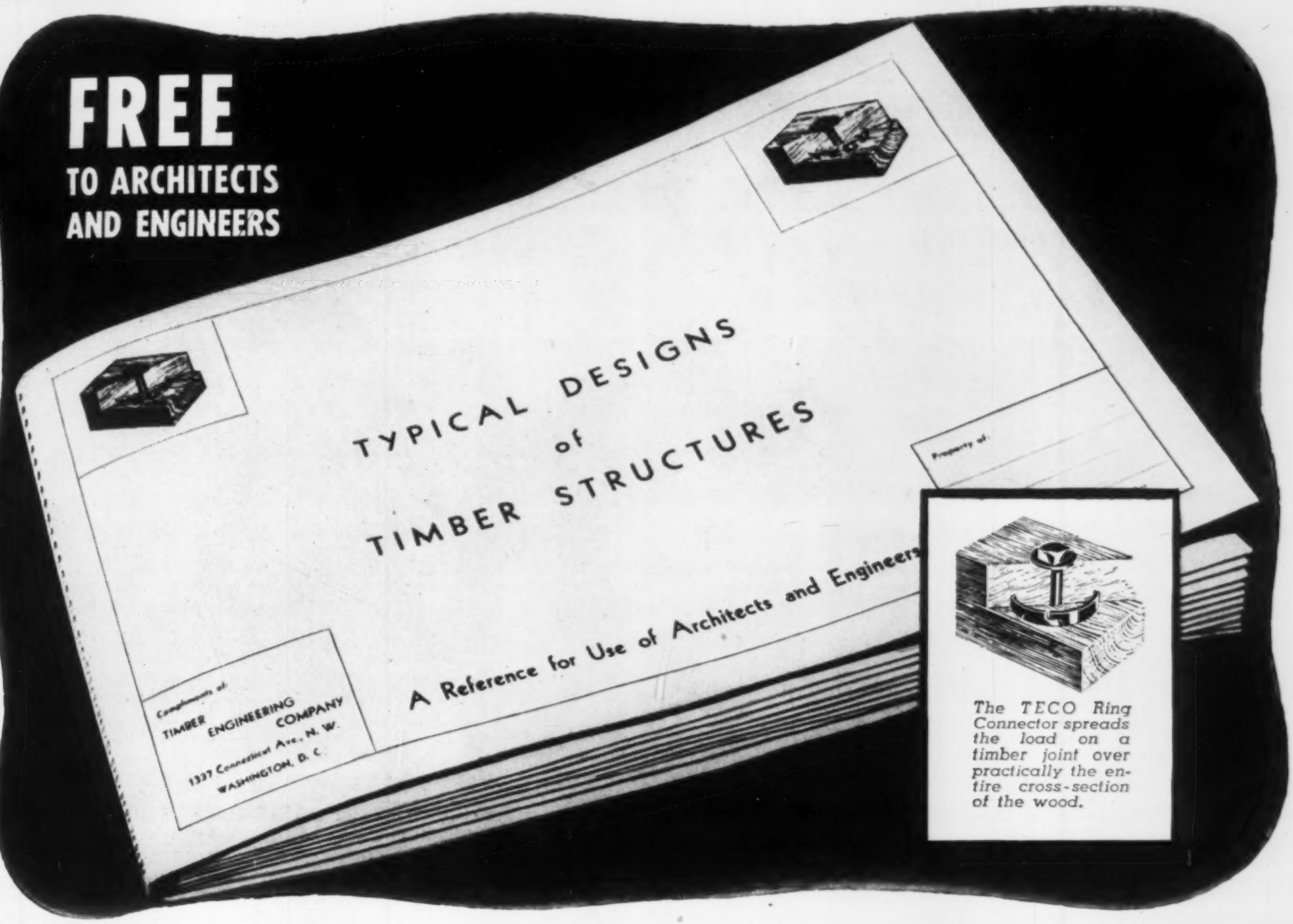
K&E
Phoenix
REG. U.S. PAT. OFF.
TRACING CLOTH
for pencil *and* ink



"ONE OF THE MOST USEFUL PIECES OF WORK THAT I HAVE RECEIVED IN 20 YEARS"..

WRITES ONE ARCHITECT

FREE
TO ARCHITECTS AND ENGINEERS


TYPICAL DESIGNS of TIMBER STRUCTURES
A Reference for Use of Architects and Engineers
Compliments of: TIMBER ENGINEERING COMPANY
1337 Connecticut Ave., N. W.
WASHINGTON, D. C.
Property of:

The TECO Ring Connector spreads the load on a timber joint over practically the entire cross-section of the wood.

AND HERE'S WHAT SOME OTHERS SAY:

"An excellent reference book at a most appropriate time. Thank you!"

"Many thanks. Best thing I've seen. Much appreciated."

"These designs are a great time saver to the architect."

"A very commendable job in bringing data to the architect, of high practical value."

In TYPICAL DESIGNS OF TIMBER STRUCTURES we have grouped the plans of 45 representative types of timber structure that have been *engineered* by the TECO System of Construction. A request on your professional letterhead will bring you a copy of this valuable reference book.

Timber ENGINEERING COMPANY

WASHINGTON, D. C. PORTLAND, OREGON

Look behind this
CURTAIN OF STEEL

See how America is conserving this vital war material on the *production* front for use on the *firing* line. Step into a Lock Joint fabrication plant and note the economy and skill with which it employs its steel allotments.

The core and ribs of each length of pipe are formed by a steel cylinder and encircling cage—and it is this steel skeleton that safeguards against pressure and stress. By adapting pipe design to closely conform with the hydraulic and operating conditions along the route of installation, Lock Joint Reinforced Concrete Pressure Pipe provides maximum strength with a minimum use of war-essential steel.

Behind America's battle lines lie the water supply lines of your community. Keep them flowing. Insure their long life and dependability. Specify Lock Joint Reinforced Concrete Pipe.

SCOPE OF SERVICES • *Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply Mains as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous lines.*

LOCK JOINT PIPE COMPANY
Established 1905
AMPERE, NEW JERSEY
Denver, Colo. • Chicago, Ill. • Kenilworth, N. J. • Kansas City, Mo.
Rock Island, Ill. • White Plains, N.Y. • Valley Park, Mo. • Cleveland, Ohio
Hartford, Conn. • Navarre, Ohio

LOCK JOINT
Reinforced Concrete
PRESSURE PIPE

THE ENGINEER

He Is The Master of the laws of nature. On a sound foundation of mathematics, science and economics, he bends the materials and forces of nature to his plan and rears the structure of civilization.

With Vision, resourcefulness and integrity, he labors to increase the comfort, wealth and safety of his fellowman.

He Attacks His Problems, with the vision of the pioneer, the integrity of the scientist, the accuracy of the mathematician, the practicality of the business man, the resourcefulness of the inventor and the courage of a conqueror.

He Is The Planner and Builder. He builds his visions into enduring realities.

He Is The Pathfinder of civilization. He breaks down barriers, bridges chasms, establishes communication and straightens the way for commerce and human progress.

He Is The Protagonist of efficiency. He reduces effort, eliminates waste and increases production. He is the creator of a nation's wealth. He drains the swamps, reclaims the deserts, develops resources and harnesses power. He builds the machinery of industry, the wheels of commerce and the structure of business.

He Is The Great Co-Ordinator. He plans and conducts the direction of projects representing the investments of millions of dollars and involving the labor of thousands of men.

He Investigates with open mind, and gets the facts before he makes decisions. He plans with thoroughness and builds with fidelity.

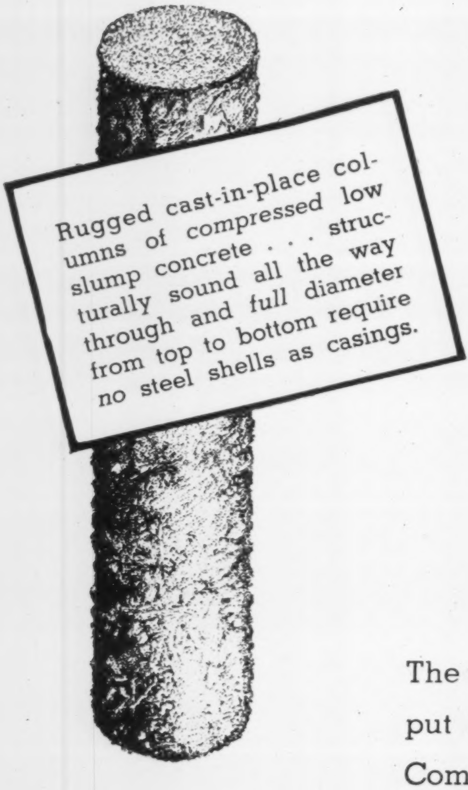
To His Rich Heritage from the labors of past generations of engineers and scientists, he adds his contributions. He continues the work of forcing outward the challenging barriers that separate man's efforts from the impossible.

By

D. B. Steinman

100,000 BAYONETS

or 440 37mm. anti-tank gun barrels can be made from the more than 500 TONS of STEEL SAVED



Rugged cast-in-place columns of compressed low slump concrete . . . structurally sound all the way through and full diameter from top to bottom require no steel shells as casings.

by MACARTHUR COMPRESSED [UNCASED] CONCRETE PILES

on another synthetic rubber plant foundation we have just completed.

Ford, Bacon & Davis, Inc., Engineer-Contractor

The way to *save* steel is not to waste it. Steel should not be put back underground. In all cases where MacArthur Compressed Concrete Piles (uncased) are used, vital metal is released for War needs.

MacARTHUR

CONCRETE PILE CORPORATION, 18 East 48th Street, New York City
Established 1910
BOSTON: 6 Beacon Street • NEW ORLEANS: 823 Perdido Street
CINCINNATI: 1542 Shenandoah Avenue • CLEVELAND: Swetland Building • PITTSBURGH: 530 William Penn Pl.

Among Our Writers

C. R. Young for 35 years has been engaged in engineering educational work at the U. of Toronto. Throughout this period he has conducted a civil engineering consulting practice. He was a member of the Royal Commission on Transportation of Ontario in 1937–1938 and has written extensively on technical subjects.

R. F. Riegelmeier (Carnegie Tech., B.S. in E.E. '26) was engaged 6 years with the Pittsburgh Bureau of Traffic Planning and 4 with the Eagle Signal Corp., before he assumed his present position as Traffic Engineer for the Penn. Dept. of Highways in 1939. He has lectured for Penn. State College and the Yale Bureau for Street Traffic Research.

C. K. McCracken (U. of Mich., in C.E.) was employed by the American Bridge Co. for 14 years. He engaged successively in structural drafting, designing, and estimating, and in the sale of fabricated and structural steel. In 1939 he joined the U.S. Steel Export Co. as a Contracting Engineer.

H. D. Hussey (Tufts College, '11) had early experience in the drafting rooms of McClintic-Marshall Construction Co., Boston and Maine RR, and American Bridge Co., before entering the New York designing office of the last-named company in 1920. He has long been active on research committees of the Society and the Am. Inst. of Steel Constr.

J. G. Jobes, (U. of Mich., B.S. in C.E. '29), now on active duty as First Lt. in the Corps of Engineers, gained his engineering experience in the Corps. He helped to establish the U.S. Waterways Experiment Sta. at Vicksburg and has served in the Zanesville and Los Angeles Districts, in the latter as Chief of the Hydraulics Section, 1935–1941.

J. H. Douma (U. of Calif., '35) has been with the U.S. Waterways Experiment Sta. (Vicksburg), the Bureau of Reclamation (Denver), and since, 1939 at the Los Angeles U.S. Engineer Office on hydraulic design.

John R. Carreker (Ala. Poly. Inst., B.S. '30, M.S. '33) did rural electrification work for 2 years, and was project engineer for the U.S. Dept. of Agricul. on soil conservation demonstration for 3 years, before he became, in 1938, Associate Agricultural Engineer for the So. Piedmont Experiment Sta.

Harry A. Shuptrine (U. of Mich., B.S.C.E. '09) had early experience with the Pere Marquette RR (Detroit), the Mount Vernon (Ohio) Bridge Co., and the Dominion Bridge Co. (Montreal, Canada). Since 1919 he has been Bridge Engineer for the Bd. of County Road Comm'rs, Wayne Co., Mich.

Julian C. Mead (U. of Mich., B.S.C.E. '09) had bridge, municipal, and railroad engineering experience when in 1921 he assumed his present position as Chief Bridge Designer, Bd. of County Road Comm'rs, Wayne Co., Mich.

D. C. Tennant has been with the Dominion Bridge Co. for many years as a structural engineer with considerable responsibility in the design and completion of many of their larger contracts such as bridges, sheds and elevators, head frames for mines, and plant extensions.

Winston E. Wheat (Miss. A.&M., '12) after 7 years with the Corps of Engineers as Inspector and Jun. Engineer on locks, dams, levees, and fortifications, became in 1919 County Engineer of Escambia County, Fla., where he has since served except for a brief period.

Ellis L. Armstrong (Utah State Agri. Col., B.S. in C.E. '36) has been with the Bureau of Reclamation on earth-fill dam construction since graduation. He has been connected with three earth-fill dams and is now in charge of foundation treatment and testing installations at Anderson Ranch Dam.

Volume 12 Number 12

December 1942

AMERICAN SOCIETY OF CIVIL ENGINEERS FOUNDED 1852

Copyright, 1942, by the
American Society of Civil Engineers
Printed in U. S. A.

Entered as second-class matter September 23, 1930, at the Post Office at Easton, Pa., under the Act of August 24, 1912, and accepted for mailing at special rate of postage provided for in Section 1102, Act of October 3, 1917, authorized on July 5, 1918.

CIVIL ENGINEERING

Published Monthly by the
American Society of Civil Engineers
(Founded November 5, 1852)
Publication Office: 20th and Northampton Streets, Easton, Pa.
Editorial and Advertising Departments:
33 West 39th Street, New York

This Issue Contains

Cover—Cuscatlan Bridge, El Salvador (*See article, page 661*)

Page of Special Interest—"The Engineer," a tribute by D. B. Steinman, M. Am. Soc. C.E., drawn and decorated by Aubrey R. Pentecost, Jr., graduate student at Virginia Polytechnic Institute . . . 5

Something to Think About

The Place of the Engineer . . . 657
C. R. Young

Selection of Civilian Evacuation Routes . . . 659
R. F. Riegelmeier

Cuscatlan Bridge in El Salvador

General Description of the Project . . . 661
C. K. McCracken
Design and Construction Details . . . 663
H. D. Hussey

Testing Theoretical Losses in Open Channel Flow—Part II . . . 667
J. G. Jobes and *J. H. Douma*

Soil Loss on Georgia Farms . . . 670
John R. Carreker

Davison Limited Highway—Wayne County, Mich., Part I . . . 673
Harry A. Shuptrine and *Julian C. Mead*

Moving a Coal Bridge . . . 677
D. C. Tennant

Marine Borers on the Gulf Coast . . . 679
Winston E. Wheat

Pressure and Consolidation Measurements at a Western Earth-Fill Dam . . . 682
Ellis L. Armstrong

Engineers' Notebook

Soil Penetration Tests with a Loaded Auger . . . 685
A. R. Lamm
General Solution for Earth Pressures . . . 685
A. R. Brown

Our Readers Say . . . 687
Society Affairs . . . 692
Student Chapter Annual Reports . . . 705
Items of Interest . . . 709
News of Engineers . . . 711
Deceased . . . 712
Changes in Membership Grades . . . 713
Applications for Admission and Transfer . . . 715
Engineering Societies Personnel Service, Inc. . . . 10
Recent Books . . . 12
Current Periodical Literature . . . 14, 16, 18, 20
Index to Advertisers, Alphabetical and by Product . . . 22, 23, 24
Index for "Civil Engineering," Vol. 12, Nos. 1–12 . . . I–XII

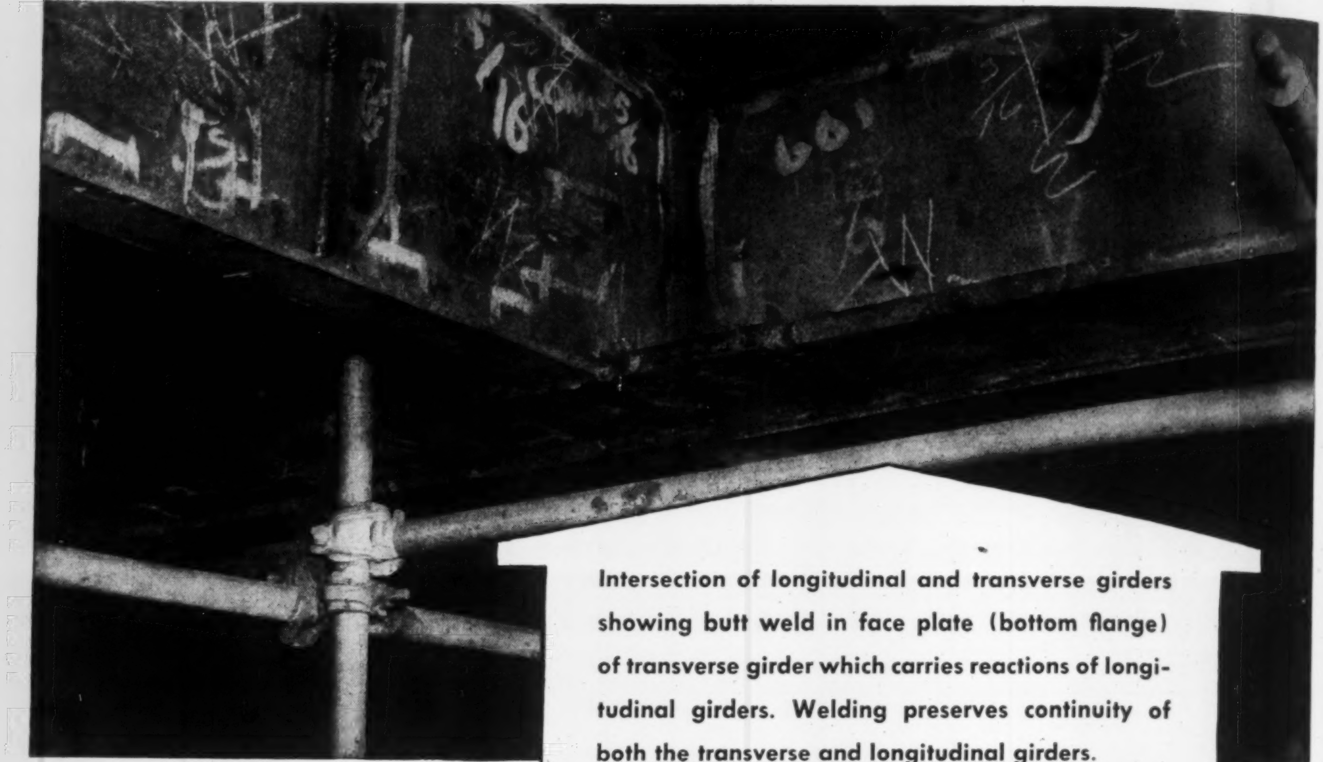
The Society is not responsible for any statements made or opinions expressed in its publications.

Reprints from this publication may be made on condition that full credit be given Civil Engineering *and the author, and that date of publication be stated.*

Subscription Rates

Price 50 cents a copy; $5.00 a year in advance; $4.00 a year to members and to libraries; and $2.50 a year to members of Student Chapters. Canadian postage 75 cents and foreign postage $1.50 additional.

Member Audit Bureau of Circulations



Intersection of longitudinal and transverse girders showing butt weld in face plate (bottom flange) of transverse girder which carries reactions of longitudinal girders. Welding preserves continuity of both the transverse and longitudinal girders.

PARALLEL WELDING METHODS

FOR MARINE AND BUILDING CONSTRUCTION

Arc welding has become the accepted method of building merchant ships because of its demonstrated superiority and its economy in the use of steel. In most respects welding methods employed in the marine field are applicable to steel building construction, since the structural engineering problems are similar, and the materials used, as well as the fundamental welding problems are virtually identical.

In addition, many structural steel fabricators are today acquiring broad experience in welding fabricating steel for welded ships and other war construction.

Air Reduction's Applied Engineering Department will supply detailed information on structural welding methods. We will be glad to assist you in working out any problems of design for welded structures.

Hatch end beam supported by main pillar carries longitudinal stringers and girders, which in turn support deck beams.

Air Reduction

***General Offices:* 60 EAST 42nd ST., NEW YORK, N. Y.**
IN TEXAS:
MAGNOLIA-AIRCO GAS PRODUCTS CO.
General Offices: HOUSTON, TEXAS
OFFICES IN ALL PRINCIPAL CITIES

AIRCO WILSON

OXYGEN IS PRODUCTION — *Don't Waste it!*

Something to Think About

A Series of Reflective Comments Sponsored by the Committee on Publications

The Place of the Engineer

From a Luncheon Address at Joint Meeting of the Society and the Engineering Institute of Canada, Niagara Falls, Ontario, October 14–15, 1942

By C. R. Young, M. Am. Soc. C.E.

Dean of the Faculty of Applied Science and Engineering, University of Toronto;
President of the Engineering Institute of Canada, Toronto, Canada

In the scant two centuries that have elapsed since the engineer first had applied to him the designation he now bears, he has risen high in the professional scale. At no time has he stood higher than now. Not only does he head up the technological phases of both wartime industry and the maintenance of the public services, but at the same time he is in the armed forces to a far greater extent than would be indicated by a consideration of occupational statistics alone.

There are reasons for the rise of the engineer. There are reasons, too, why his progress has been less rapid than the circumstances of his scientific and technical attainments would appear to warrant.

Early Barriers to Advancement.~Professional engineering grew out of the practical achievements of clear-headed, resourceful artisans and skilled manual workers. James Brindley, the creator of the canal system of Britain, was a millwright, ill-educated but ingenious—and human. After many disappointments in attempting to improve the Newcomen engine, he frankly records in that revealing account book of his: "To running about a drinking, $^{1}/_{6}$." Things were cheaper in those days.

John Rennie, the founder of a noted family of engineers, was another millwright. Thomas Telford, who remade the highway system of Scotland, began as a stone mason. George Stephenson, who made the locomotive a practicable mechanism for transport, was a pumping-engine fireman and could neither read nor write till he was nineteen years of age.

Even in Roman times, the attitude of the literary and academic groups was hostile to these workers in a new and practical sphere. Seneca, after recording that there had been inventions such as transparent windows and tubes for diffusing warmth equally through all parts of a building, observed:

"The inventing of such things is drudgery for the lowest slaves. Philosophy lies deeper. It is not her office to teach men how to use their hands. The object of her lessons is to form the soul."

In his famous dictionary, Dr. Samuel Johnson defined mechanical as "mean or servile." Dean Swift spoke in scorn of "that fellow Newton [Sir Isaac] over the way—a glass grinder and a maker of spectacles." John Smeaton, to whom the designation of "civil engineer" was first applied, and one of the most profound philosophers of the profession, was taken to task by his fellow members of the Royal Society for having undertaken the "navvy" work of building a road across the Trent valley. In fact, the educated classes of the eighteenth century regarded mechanical subjects with contempt and pursuits involving them as neither honorable nor remunerative.

Situation Improved But Slowly.~Training for the practice of engineering was still largely a matter of pupilage or apprenticeship in the offices of practicing engineers or manufacturers. So much stress was laid on the practical that John Rennie held that a young man, after three or four years at Oxford or Cambridge, was in a sense unfitted for the practical work of engineering.

Although Rensselaer Polytechnic Institute, at Troy, N.Y., was founded in 1824, the influence of the universities and engineering colleges was slow in making itself felt. As late as 1840, when a professorship of civil engineering and mechanics was founded in Glasgow University, a vigorous campaign was carried on by the traditionalists to have it suppressed.

Engineering, a Profession?~And so the calling of the engineer was held much too close to specific technological tasks, without any notable concern for the long-range interests of the client or the country. As the late Lyman L. E. Cooley, M. Am. Soc. C.E., once asserted:

"The early engineer of this country was a species of scientific or skilled tramp with a precarious tenure of position measured by the work in progress. He furnished his employer with the skill of his trade without questioning public policy or the best solution."

It is not strange, therefore, that public recognition has lagged behind the warrant for it. Around the turn of the century, a member of the Canadian Society of Civil Engineers reported that his parents had left him a sum of money to study a profession, and when he chose engineering, certain interested persons tried to bar his claim on the ground that engineering was not a profession at all. When he succeeded, after great expense, in establishing the validity of his choice in the courts, the decision was the occasion of widespread surprise.

Turn of the Tide.~As the universities and engineering colleges more and more took over the educational aspects of the training of the engineer, the attitude of the public to the profession of engineering became more cordial. Some of the breadth of outlook that derives from the mingling of young men of widely different interests on the campuses of the world soon had its effect. Educationally, engineers came to be classed with the members of other learned professions.

For half a century there has persisted on this continent a reaching out for improved professional status for engineers. To many, the most direct route to the objective appeared to be legislation and restriction. It was all very simple. Secure a license to practice and you are set up for life.

Something Further Needed.~It is not remarkable that this simple mechanism failed to solve the problem of status. Except for a few who were excluded by reason of unsatisfactory qualifications, the relative position of engineers remained the same. One does not need to seek for the reason: licensure carries with it nothing more than an assurance of good character and minimum technical competency. Of itself, it does not reveal those who excel, either in their technical equipment or in the intangible qualities of leadership in the profession. As Willard Chevalier, M. Am. Soc. C.E., has said, "There is something bigger, more vital, and more fundamental in the professional relationship than anything you can write into a statute."

The truth of this is becoming increasingly apparent. Perhaps the most significant of the objectives of the Engineers' Council for Professional Development, and one on which emphasis ought to be placed, is the early seating of the young, newly graduated engineer firmly in the professional saddle. True, technical competency must remain the solid foundation on which the lower lifts of the young man's professional life are built, but he will not go far or fare well if he contents himself with it alone. He must develop an interest in the long-range welfare of his employer and a sympathetic understanding of the currents of national and community life. He must be able to take his place comfortably among the leaders of other professions and be able to represent with credit any institution or any just cause

The Professional Goal.~It is taken for granted, of course, that the place the engineer seeks is within the professional orbit. Whether he receives his compensation in the form of fees or in the form of salary makes no essential difference. The demands of the professional life are the same.

It is axiomatic that valid membership in a profession connotes a sound and broad education. There are no unlearned professions. The most significant element in the professional relationship, however, without which all apparent service is vain, is the principle of trusteeship. The engineer cannot afford to avail himself of the doctrine of *caveat emptor*. In common with the conscientious physician or lawyer, he seeks to procure for the employer that which will ultimately be best for the employer himself, and not that which will most benefit the adviser or give him the least personal trouble.

A Higher Responsibility.~It would have been much easier for Alfred Noble to sign the majority report of the International Commission of Engineers and to throw his great weight on the side of those who urged an attempt at the construction of a sea-level canal at Panama. Conscious of a duty to safeguard the United States against what he thought to be a hazardous enterprise, he wrote the minority report, which was finally adopted. In that act he conformed to the doctrine of trusteeship.

Not all the effort of which a professional man is capable is properly applicable to the advancement of his personal fortunes. The profession of itself has some claims on him. John Smeaton deliberately limited his undertakings as an engineer in order to broaden his horizon and carry on scientific investigation. He held that "the abilities of the individual are a debt due to the common stock of public well-being."

The Engineer in the Future.~Despite the inevitable dislocations that will occur when war gives way to peace, there is no ground for fearing long or widespread technological unemployment. An immense backlog of unsatisfied demand for the goods of peace is being built up, and the standards and patterns of 1939 will not satisfy a world that has seen invention break into new territory on innumerable fronts. The world of 1940 is already antiquated. In such a setting the technically competent will find ample scope for their abilities and energies.

It would be comforting if we could be equally sure that the engineer of the post-war years could be depended upon to do his full share in bringing about a lessening of the impact of technological advance on society. This is no imaginary menace.

The place the engineer is to occupy in the future will very largely depend on how well he adjusts himself and his technology to the whole inexorable forward movement of humanity. He must look with sympathy and understanding on the long upward struggle of mankind, and in it, through his technical attainments, he must play a vital part.

He should realize fully that not all the problems of the world can be solved by a technological approach. Much consideration must be given to those sentimental and often perverse intangibles that determine the attitude of human beings towards the great issues of life. It is idle to expect laymen to subscribe to the pious wish that everyone should try to look at things as does the engineer.

Engineer's Position Is Assured.~The plain truth is that the solution of many of our problems does not lie where engineers think it does. L. G. Straub, M. Am. Soc. C.E., has effectively pointed out the futility of the one-track approach. He believes that the engineer "fails to recognize that the structure of our social-economic order is dynamic and constantly changing—fundamentally different from technology."

And so the place of the engineer in the future is largely conditional upon the breadth of his outlook, his interests, and his activities. For one who buttresses his technical competency with a wholesome regard for the interests of his fellows and with constructive labors on their behalf, it is secure. That security is not augmented by any straining after status. More than anything else, it rests upon the individual stature of the engineer himself.

E. B. Black
President
George T. Seabury
Secretary
Sydney Wilmot
Editor in Chief and Manager of Publications
Donald D. King
Art and Production
Don P. Reynolds
Assistant Editor

CIVIL ENGINEERING

December 1942

Volume 12

Committee on Publications
Clifford G. Dunnells
Chairman
George W. Burpee
Ernest E. Howard
Lazarus White
Ralph B. Wiley
W. L. Glenzing
Advertising Manager

Number 12

Selection of Civilian Evacuation Routes

Pennsylvania Chooses Major Highways for Emergency Movement of Civilians

By R. F. Riegelmeier

Traffic Engineer, Pennsylvania Department of Highways, Harrisburg, Pa.

FULL preparedness against possible attack by enemy bombers on the home front calls for acceptance of responsibility by the various states for the protection of civilians. One of the many complications that would undoubtedly appear after any attempt to disrupt transportation or industry would be the routing of evacuees from threatened areas with the least possible confusion. Careful selection and marking of routes can help immeasurably to prepare public officials and civilians alike for any turn of events. Mr. Riegelmeier describes the precautions taken in Pennsylvania in this article, prepared from his original presentation before the session on Civilian Protection in Wartime, at the Society's Roanoke Meeting.

REMEMBERING the grave difficulties faced by the French Army when it endeavored to retreat speedily, and the dire results of the confusion created by wholesale civilian evacuation, the Commonwealth of Pennsylvania has prepared traffic-control plans for moving evacuees in the hope of avoiding a similar disaster. During an actual assault, civilians should remain in their homes or in specially designated air-raid shelters. After a first assault, however, many wives, mothers, and children may be expected to vacate the danger areas. To direct such people, and to guide those panic-stricken persons who will leave at the first sign of danger, special precautions are believed necessary.

In preparing traffic control plans for an evacuation into the state, the Pennsylvania Motor Police conducted a detailed survey of the probable theater of operations. An evacuation area of approximately 100 miles west of the Delaware River, extending from the New York State line to the Maryland State line, was selected as appropriate. Each point of entry into Pennsylvania from New Jersey was studied carefully. The principal entrance points are over bridges and each bridge was classified for its capacity in live load, its width in number of lanes, and whether it is toll or free. Ferries were classified as to schedule and carrying capacity.

From each of these evacuation points, of which there are 23, routes were selected leading westward. The selected routes make use of the major highway system whenever possible. This is a distinct divergence from the evacuation plans of some states, which have selected secondary routes for this purpose. The use of a well-coordinated and fully prepared plan permitting evacuees to travel over the major highways under the control of trained state and city police will, it is believed, save lives, minutes, and dollars.

FOUR SECTORS OF EVACUATION CONTROL

Pennsylvania's 23 evacuation points are divided into four sectors, and routes from the points in each sector converge toward the nearest major highway leading west. Each sector represents a basic unit of command, and the four sectors are merged into a composite organization through the facilities of telephone, teletype, and commercial broadcasting stations.

A motor police officer will be in charge of each sector, with headquarters located at the police barracks in the cities selected—Hazelton, Bethlehem, Philadelphia, and Reading. Reading is the center of all operations and communications, and the police officer in charge at this post supervises the activities of the officers in charge of each of the sectors. Evacuation movements through cities and towns will be expedited by local police officials.

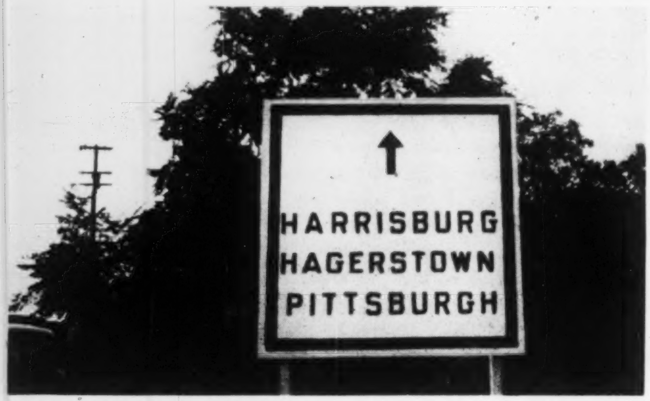
Control points were established at major intersections in each sector, and were designated according to the traffic routes. For example, the control point at Fogelsville is 22A, as this is on U.S. Route 22. Each succeeding control point westward is indicated as 22B, 22C, etc. At each control point information was obtained regarding the name of the nearest town, the commercial radio station (with its telephone number) which would serve this particular point, and the name and address of the liaison officer at that point. A record of all hospitals and doctors along each of the selected routes was also secured.

This information was tabulated and given to the traffic engineer for use in the preparation of maps. A separate map was prepared for each sector, showing the selected evacuation routes, all major intersecting traffic routes, control points, and evacuation points, with information on the widths and capacities of all bridges crossing into

Esso
EVACUEES FOLLOW GREEN ARROW

Bridgehead Directional Signs Prepared for Pennsylvania's Evacuation Routes the state. Also indicated on these maps are the secondary routes that would be used in the event of a complete closure of a major highway, the command post location, communication and liaison information, the number of hospitals and doctors in each city or town along the route, the strength of the police force, the police equipment available, and the design and location of bridgehead and directional evacuation signs. The sector maps were prepared for the use of motor patrolmen.

From the four sector maps, a master map covering the entire area was prepared to provide the center of operations and communications at Reading with the overall picture. Radio, teletypewriters, and telephone communications for each control point were located and recorded on a separate communication facilities map. The entire area was divided into smaller areas which are in the broadcast range of the selected commercial radio stations. Six such stations—located at Allentown, Harrisburg, Hazelton, Philadelphia, Reading, and Scranton—will be used. This map lists all the control points in the area which will act upon orders transmitted from each station. It also shows the call letters, telephone numbers, and frequencies of the selected stations.



DIRECTION OF LARGE CITIES INDICATED BY ROADSIDE EVACUATION MARKERS

Authority for the stations to perform this emergency service must be obtained from the Federal Communications Commission at the time of the emergency, in accordance with Section 2.92 of the rules and regulations of the Federal Communications Commission. When, upon the approach of enemy aircraft, radio broadcasting facilities are restricted, teletypewriters and telephones will be utilized.

These arrangements present a complete and positive control system for the prompt dispatching of orders from the center of operations at Reading.

Signs in the form of green arrows have already been erected along evacuation routes to guide evacuees and to supplement the instructions and directions of the motor police at the control points. At bridgeheads, signs bearing the message "EVACUEES FOLLOW GREEN ARROW" will be erected, to explain the meaning of the green arrows, just as soon as an emergency occurs. At this time also, large directional signs will be erected at the proper key points providing information on the direction to certain larger cities. The plan contemplates moving the evacuees westward for a distance of approximately 100 miles before they are diverted toward their destinations.

All the signs required have been made in the sign shops of the Department of Highways in the various counties involved in this traffic control plan. The bridgehead and directional signs are available for immediate erection upon notice to employees who have been previously instructed in their location and placing. When the emergency call from the center of operations and communications at Reading is received by the Chief Maintenance Engineer of the Department of Highways, he will instruct all highway offices involved to immediately erect the remaining evacuation signs. This entire process can be performed in an inconceivably short period of time.

Another set of plans has been prepared to expedite the movement of civilian evacuation traffic in the vicinity of military reservations. The purpose of these plans is to make it possible, if necessary, to close entire sections of evacuation routes on extremely short notice so that the full width of the highway can be used for moving the entire personnel of the reservation or any other large army convoy. In this set of plans, information is provided and spotted on maps indicating the location of patrol posts at street and road intersections, the orders for the organization of the patrol forces necessary for manning these posts, the routes to which the civilian evacuee traffic is to be diverted, and the general orders for putting this plan in operation.

PATROL POSTS LISTED

Each patrol-post intersection is listed by county, nearest city or town, and route numbers of the intersecting traffic routes. The movement of police required and the authority or branch of police to patrol the intersection are also listed. The organizations cooperating in this project are the Pennsylvania Motor Police, the Army Military Police, the Civilian Defense Emergency Police, and the local city police.

The remaining large-scale maps for this project show explicitly the control posts in the vicinity of military reservations and within the cities of Allentown, Bethlehem, and Easton. The route that the Army will use through these cities will be patrolled at each intersection, and the maps clearly indicate which police authority will be in charge at such points. Care was exercised to select by-pass routes that are on the snow-removal program so as to entail the least amount of inconvenience. The maps, supplemented by written instructions, are forwarded to all interested agencies so that the assisting personnel will be familiar with all details. Communications control will be established as in the evacuation studies.

A map of military highways has also been prepared for the use of the armed forces, on which all military or naval posts in and around Pennsylvania are spotted. The recommended "through highways" in the state are shown—also major highways leading from the military or naval posts to the state lines. Interconnections between individual posts are also given in detail.

ALL ROUTES ARE DESIGNATED AT INTERSECTIONS, WHERE CONFUSION MIGHT ARISE

Cuscatlan Bridge in El Salvador

THE largest bridge in Central America has been erected across the Lempa River, El Salvador, to complete another link of the Pan American Highway. The main suspension span of 820 ft is carried by cables of open construction, chosen to fit the unusual erection conditions. Credit is due to the people of El Salvador for their foresight and also to the American engineers who successfully coped with unusual construction and transportation problems to put up this fine example of the bridge-builder's art.

General Description of the Project

By C. K. McCracken

Contracting Engineer, U.S. Steel Export Company, New York, N.Y.

CONSTRUCTION of the Cuscatlan Bridge removes a major obstacle in the transportation network of this neighbor American Republic and levels one more barrier to the completion of that great artery of Inter-American commerce and defense—the Pan American Highway. The completion of this structure fulfils an age-old dream of the people of El Salvador, smallest American Republic. The sentiments of these people are expressed by the following inscription which appears on the official name tablet:

> CUSCATLAN BRIDGE
> DREAM OF A CENTURY, REALIZED BY A GOVERNOR OF PATRIOTIC FAITH AND AN INDUSTRIOUS AND VIRILE PEOPLE, WHO WISHED TO PAY FOR THIS WORK THEMSELVES, AS IT UNITES EVEN MORE CLOSELY THE SALVADORIAN FAMILY AND THE REST OF AMERICA WITH WHOM WE ASPIRE TO FORM A SOLID CONTINENTAL DEMOCRACY—MARCH 1940–JUNE 1942

Picturesque El Salvador, with an approximate area of only 13,176 sq miles, is the only republic in the Central American group that does not touch both the Atlantic and the Pacific oceans. It has a coast line of 160 miles and an average depth inland of 60 miles. Its terrain is generally hilly; a volcanic range approximately parallels the coast.

El Salvador was invaded in 1524 by Pedro de Alvarado, who led an over and expedition from Mexico by way of Guatemala, and in 1525 captured the Indian capital of Cuscatlan. Today the country has a population of about one and one-half million, some 70% of which is rural. These industrious people manage to produce one-third of all the coffee exported from Central America, making their nation the fourth largest coffee producer in the world. Among the other commodities produced are sugar, corn, rice, beans, henequen, and cotton.

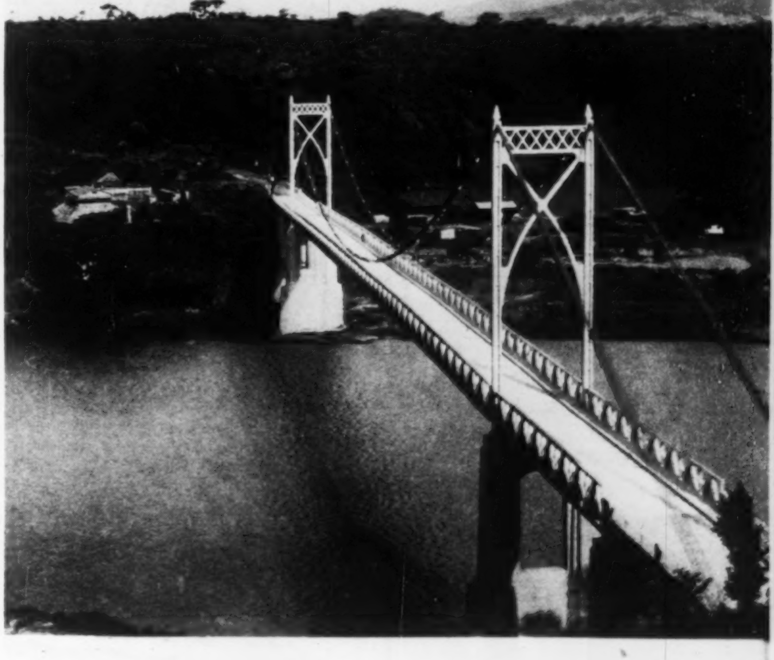
The Lempa is the largest river flowing into the Pacific Ocean between the Colorado River in the United States and the Strait of Magellan at the southern tip of South America. It rises in Guatemala and enters the Pacific Ocean through a broad estuary studded with islands. Although it is considered a navigable stream, it cannot be entered by seagoing vessels because of a shallow bar at its mouth. In its 200 miles of length it drains an area of 6,000 sq miles and divides the country into three sections, which have often been separated because of flood waters.

TWO IMPORTANT CITIES LINKED

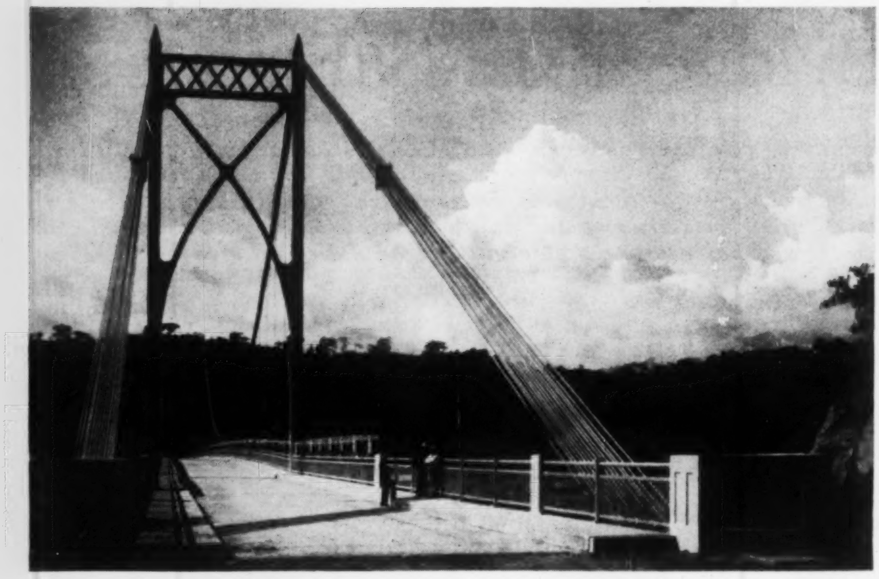
At the site of the Cuscatlan Bridge, the width of the channel is approximately 800 ft, and the normal or low-water depth is about 5 ft. The elevation of the surface of low water is about 56 ft above sea level. Ordinarily high water does not reach more than 14 to 16 ft above low water, but occasionally there are extraordinary floods which have been known to raise the flood crest as much as 40 ft above the low-water level.

At the present time the principal traffic across the river at this point is between San Salvador, the capital and largest city of the country, located 93 km to the northwest, and San Miguel, an important city about 50 km to the east. Prior to the erection of the bridge, the crossing was made by a single car ferry propelled by hand poling or the force of the current and guided by a steel cable stretched between trees on the river banks. Delays of hours or even days often occurred because of the limited capacity of the ferry and the high flood waters during wet seasons. The crossing was also hazardous at times, resulting in the loss of many lives and valuable cargoes.

The Salvadorian's "Dream of a Century" first showed promise of fulfilment when on July 5, 1939, the Procurement Office of the Republic issued invitations for bids on a cantilever-type bridge. Subsequent changes in design caused the issuance of new bids on a suspension type. These bids were received on December 15, 1939, and although the invitations were issued for a bridge with a minimum distance of 590 ft $6^{5}/_{8}$ in. (180 meters) between towers, the contract was based on an alternate proposal for a suspension bridge 820 ft $2^{1}/_{2}$ in. (250 m) between towers to permit placing the main piers outside of the main river channel.



General View of the Bridge Looking East



WEST APPROACH TO SPAN

Because of the lack of borings or other information on subsurface conditions, negotiations were not completed until March 1940, when the contract was signed. The lack of subsurface information made it necessary for the work below the natural ground line to be done for the account of the government, while the lump-sum portion of the contract covered only the taking of borings, construction of masonry work above the ground line, and the steel superstructure and cable anchorages.

Test borings for the foundations and anchorages were started in April 1940, and actual excavation commenced in July of the same year. Final tests and formal acceptance of the bridge by the government occurred on May 25, 1942.

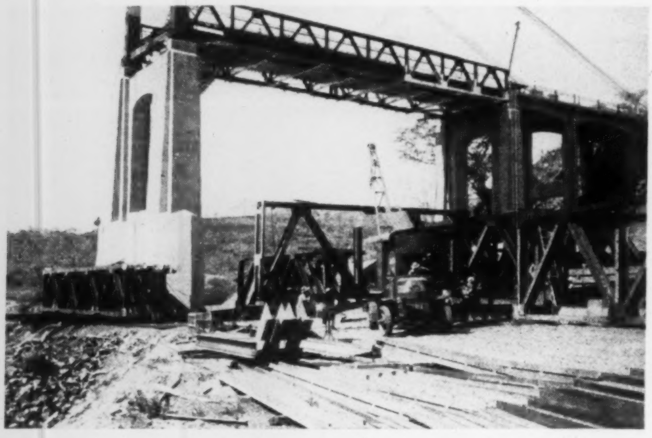
TECHNICAL FORCE SENT FROM THE UNITED STATES

A camp was constructed at the site of the bridge for housing the technical force from the United States, as well as the wives of some of the men. These men and women deserve much credit for the part they played in constructing the bridge, which involved living in a tropical section, where it was necessary to contend with excessive heat, not to mention scorpions and other insects. The average noonday heat in the dining room of the construction camp for the duration of the work was 100 F. As the construction work progressed, a small village, housing up to 500 people, including the families of the workmen, sprang up at the bridge site. This village was composed mostly of typical native dwellings with thatched roofs.

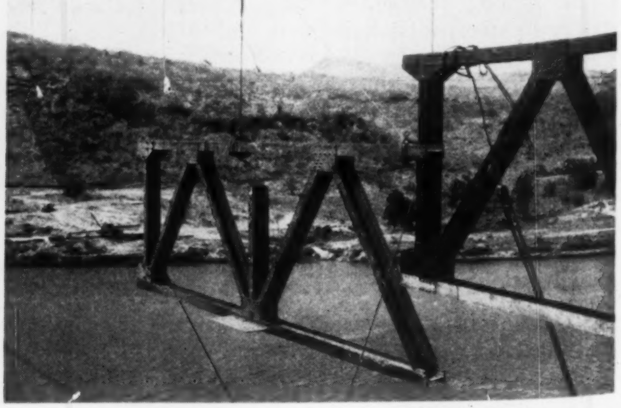
June 6, 1942, the day of the dedication, was proclaimed a national holiday, and a special 5-gal gasoline rationing coupon was issued to motorists attending the dedication. Many of the visitors did not need these five gallons, as they began to arrive at the workers' village by ox-cart and on foot two or three days beforehand. Approximately 12,000 people attended the ceremonies despite the long distances that had to be traveled from the populated areas of the country. The ribbon cutting was performed by President General Maximiliano Hernandez Martinez with a special pair of gold-plated shears presented by the U.S. Steel Export Company. The President delivered the principal address, after which E. E. Valentini of the Pan American Federation spoke unofficially on behalf of the United States.

The ceremonies were rendered particularly impressive by the participation of various national military units, including the Air Force. It is regrettable that a large number of American citizens could not have attended the ceremonies to observe at first hand the friendly feeling of these Latin American neighbors. Their distinguished President gave effective utterance to this attitude in his address, a typical passage of which is quoted in the following paragraph:

"We are inaugurating today the fourth bridge constructed by the Government over the Lempa River. Cuscatlan and El Burrel were built to connect the Eastern Zone with the Center and Western zones of the Republic. These projects ought not to be considered as national, since the Pan American Highway (Carretera Panamericana), which has been planned to unite by its cultural strand the countries of the Americas, seems to be a string of hearts beating in unison for the same ideals of these youthful and energetic nations who aim to give the world the best of their culture—a democratic culture which will save the peoples from barbarism. As in the course of history nations have risen like Persia, Egypt, Greece, Rome, and France, lighting the sacred flame of human liberties, we are the custodians of this sacred fire,



STIFFENING TRUSSES WERE ASSEMBLED ON THE SITE BEFORE ERECTION



TRUSS SECTION IN MAIN SPAN OF THE BRIDGE BEING SWUNG INTO PLACE and it is our duty to watch and maintain the flame on this continent."

Those who traveled to the ceremonies by automobile from San Salvador drove over well-paved roads along which Red Cross stations were spaced every few miles to minister to possible accident victims. The highway was lined with cheering people who, unable to make the trip, waited to see their popular President pass. Decorations and flags bedecked even the humblest cottage along the highway. A festive spirit prevailed everywhere as the Salvadorians gave vent to their pride in building the longest suspension bridge in Central America. A part of the ceremony was relayed to the United States by short-wave radio, where it was re-broadcast on a national hookup. Many of the native visitors were skeptical about venturing onto the bridge, but they quickly realized that it would not fall down even though there were no supports between the main river piers. In fact the structure became a promenade after it was officially opened. A fiesta which followed the day's formalities lasted until far into the night—a fitting conclusion to a memorable day in the country's history.

The bridge was opened for public use on June 7, 1942. Although automobiles and trucks pay a toll charge of one *colone* (40 cents in U.S. currency) pedestrians, animals, and ox-carts are allowed to cross free. A postage stamp commemorating the inauguration of this bridge is being issued by the government of El Salvador.

Design and Construction Details

By H. D. Hussey, M. Am. Soc. C.E.

Designing Engineer, American Bridge Company, New York, N.Y.

The Cuscatlan Bridge is of the suspension type with unloaded backstays. The main span is 820 ft $2^1/_2$ in. between pier centers. Flanking spans, of 131 ft 3 in. at the west, and 98 ft $5^1/_4$ in. at the east, make a total length of steelwork of 1,049 ft $10^3/_4$ in. Approaches to the bridge consist of reinforced-concrete rigid-frame structures 113 ft $7^1/_2$ in. and 189 ft $5^3/_4$ in. long, at the west and east sides, respectively. An elevation of the bridge is shown in Fig. 1.

Traffic facilities provided on this bridge include a 19-ft $8^1/_4$-in. roadway and two 4-ft $11^1/_{16}$-in. sidewalks. The roadway elevation of 154.20 ft was fixed for the entire structure, except for the camber in the main span.

An H-15 live load, and unit stresses as specified in 1935 by the American Association of State Highway Officials, determined the design of the structure. The design also included provision for earthquake stresses. A uniform live load of 1,200 lb per lin ft was used in the design of the cables and stiffening trusses, except that 1,300 lb was used for partial loading.

The desire of the El Salvador government to make this bridge of monumental character had special bearing on the design of concrete work and towers of the main span.

The bridge is near the base of an extinct volcano. Test borings indicated that the foundations and anchorages would be in volcanic materials consisting of cemented ash and loose boulders or stones. These materials lie in very irregular strata and pockets.

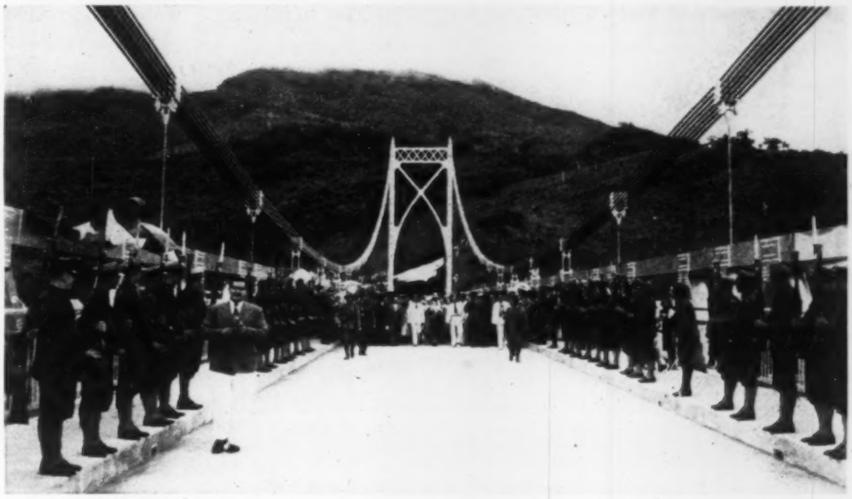
Since the bridge may be subjected to earthquake shock, special care was necessary to support the assumed earthquake forces in the design of the concrete approaches. A study of this feature indicated that multiple-span rigid-frame structures were required. The rigid-frame structure at the west approach consists of three spans and two column bents, as shown in Fig. 1. The end spans are assumed to be hinged at the abutment and at Pier 3.

At the east approach, the structure consists of four spans and three column bents, and the end spans are assumed to be hinged at Pier 6 and at the east abutment. All columns have a constant cruciform section, 5 ft 6 in. by 5 ft 6 in. The two main longitudinal girders are 2 ft 6 in. wide and 4 ft 2 in. to 6 ft 11 in. deep. The tops of these girders, which are 22 ft $2^1/_4$ in. center to center, form the curbs and part of the sidewalks. Beam and slab construction is used for the floor. A metal railing, similar to that on the main span, is used on the concrete approaches. This railing connects to concrete posts over the piers and abutments.

The reinforced concrete frames were designed for a combination of dead load, live load, temperature, shrinkage, and earthquake forces. The temperature variation was taken as 15 F above or below the mean, for this climate. The horizontal earthquake forces acting on any portion were assumed to be 10% of the dead weight of that part, acting either transversely or longitudinally. Frame moments were computed for each character of load by distributing fixed-end moments. Allowable unit stresses were increased 33% for combined loading, including earthquake effects.

EARTHQUAKE RESONANCE AVOIDED

Piers under the approaches are founded on the sloping banks of the river, generally in volcanic ash. The dead-



Dedication of Cuscatlan Bridge, June 6, 1942
Cable Clamps and Hangers Shown

load plus live-load pressures on these footings were limited in the design to 2.0 tons per sq ft, with 2.67 tons per sq ft permitted for the combination of dead, live, temperature, and earthquake forces. The footings were proportioned so that the resultant under combined forces, including earthquake, was always within the middle third of the base.

A factor in the design of structures built to resist earthquakes is the natural period of vibration. As authorities differ on the natural period of earthquakes, the problem of avoiding resonance is still open to constructive work. The general understanding appears to be, however, that a natural period of from 0.5 sec to 1.5 sec may encourage resonance. The natural period of the transverse bents of the Lempa River Bridge concrete approaches is less than 0.5 sec, and that of the longitudinal frames is of the order of 0.25 sec. A factor contributing to the safety of the longitudinal frames against resonance is the varying heights of the columns, each of which has a natural period of its own, different from the others.

A change in alinement lowered the ground line under the east approach and resulted in a high fill back of the east abutment. It was necessary, therefore, to design a high abutment, subjected to earthquake forces on its own mass and on the fill behind it. An open abutment of concrete truss construction was designed to meet these conditions, supporting the end of the rigid frame and permitting the fill to spill through it.

Reinforcing bars were made as simple as possible, and in lengths not to exceed 40 ft to facilitate shipping to the site and bending to shape in the field.

Since the approaches constitute such a large part of the visible masonry work on the bridge, special care was taken to bring the pier shafts of the main span into architectural harmony with them. To that end each main pier was divided into twin shafts above the level of the highest recorded flood and connected by a flat arch at the top. These piers are 90.80 ft high above low water. Below low water the main piers are of rectangular section, 27 ft by 60 ft. The main piers exert a pressure under dead load plus live load of only 3.5 tons per sq ft in addition to the pressure which existed in the subsoil before the piers were built.

The design was adaptable to sinking the main piers either by pneumatic or open dredging methods. Equipment for the pneumatic process was provided because of the irregular character of the ground formation, and since it was not known how deep it would be necessary to go to reach proper bearing material. Tests were made during construction to prove the bearing value of the material at the bottom of the pier excavations. As a result, only the caisson for the main pier on the east side of the river was sunk pneumatically. The one for the main pier on the west side was an open concrete caisson sunk by dredging.

The main bridge anchorages, to be described later, were constructed in tunnels 70 ft deep, which were driven into volcanic rock. The cross-section of each tunnel was 3 ft 6 in. by 8 ft 6 in. for a distance of 51 ft from the entrance. From this point to the end of the tunnels the cross-section was gradually enlarged to a maximum of 14 ft by 14 ft. These enlarged ends, as well as 15 ft more of the main tunnels, were filled with concrete as soon as the anchorage steel was erected. The remainder of the tunnels was concreted just prior to completion of the bridge. The steelwork in the east anchorages was encased in concrete for a distance of about 30 ft outside the tunnels, where it was buried in the approach fill. All anchorage steelwork was encased in concrete up to within a few inches of the cable strand sockets, which were left exposed.

STEEL SUPERSTRUCTURE

Cables, towers, and anchorages were designed for the computed uniform dead load of 3,250 lb per lin ft for the suspended span, plus the assumed live load of 1,200 lb. Details of the superstructure of the bridge are shown in Fig. 2.

Cables of open construction were adopted after careful consideration of the difficulties of erection. The cable sag was made one-tenth of the span length, or 82 ft, and the slope of the cable was equalized at the two sides of each tower. Each cable consists of 16 pre-stressed galvanized bridge strands $1^{15}/_{16}$ in. in diameter. These strands have a minimum breaking strength of 230 tons each and were designed for a factor of safety of 3. The 16 strands in each cable are grouped in 4 layers of 4 strands each, spaced 4 in. on centers both horizontally and vertically.

Pre-stressing the strands was done by holding them under a tension of nearly one-half their breaking strength for several hours until their inelastic stretch had ceased. The tension was then reduced to the dead-load stress and the strands were measured under this tension. The average length of strand was 1,385 ft $6^3/_4$ in. between the end sockets.

Anchorage steelwork at each end of each cable consists of 32 rods (2 for each strand), which extend from the

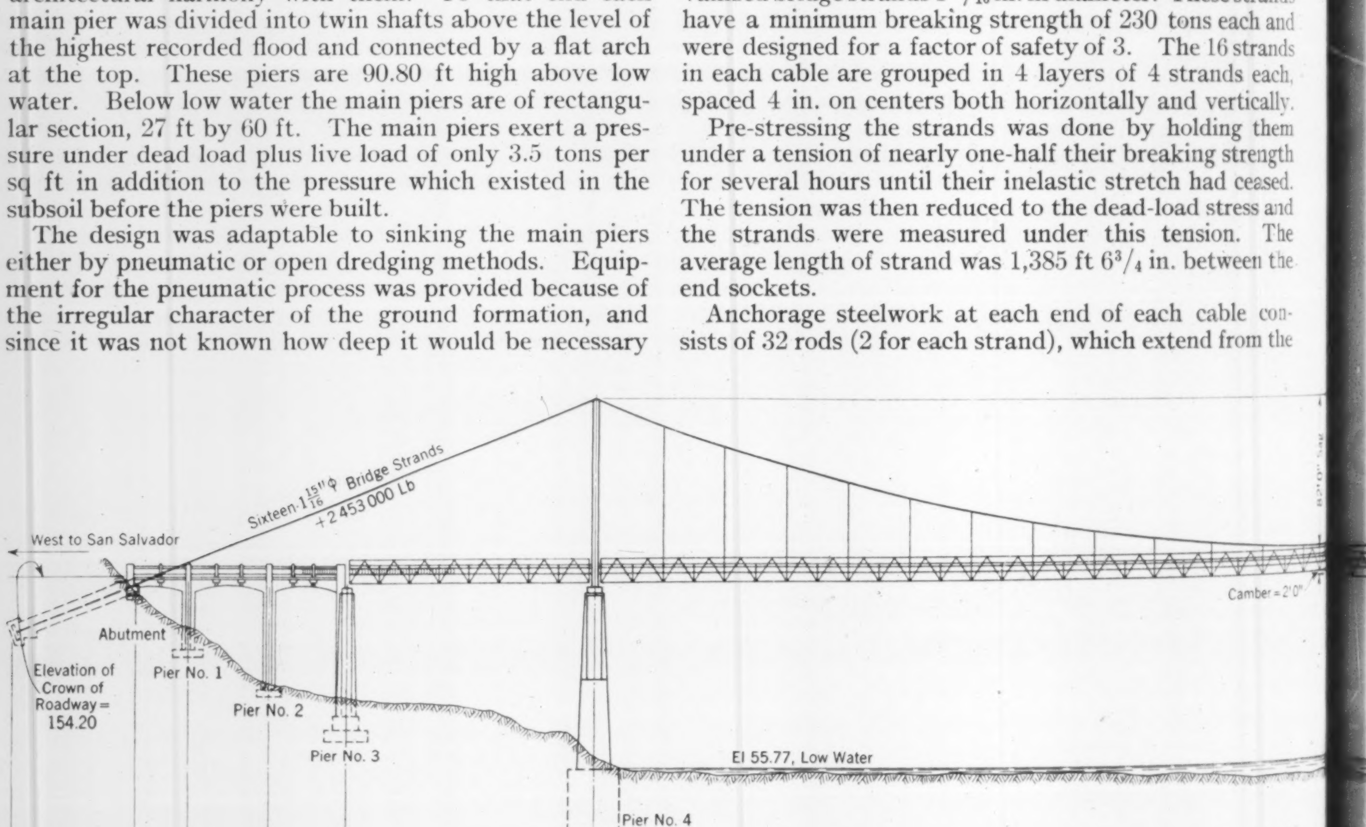


FIG. 1. ELEVATION OF CUSCATLAN SUSPENSION BR

strand sockets to anchorage girders at the end of the tunnels. These rods are $2^3/_8$ in. in diameter, with upset ends, except that the first sections which connect to the strand sockets are $2^5/_8$ in. in diameter, not upset, in order to provide greater sectional area where they enter the concrete. The $2^5/_8$-in. rods were threaded for a distance of 14 in. at the socket ends to provide for adjustment of the strands during erection.

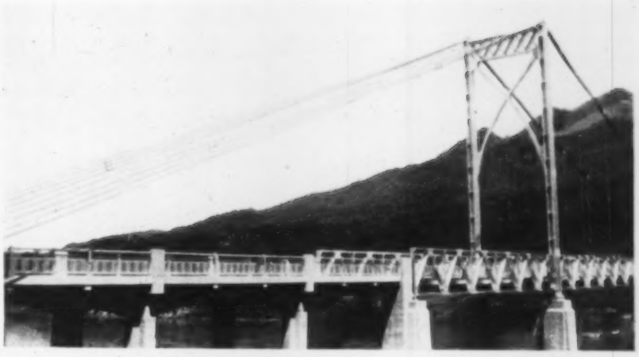
The saddles at the tops of the towers were constructed of rolled steel plates and welded as far as possible. Bent plates 4 in. thick were used between successive layers of strands in order to maintain the open cable construction over the towers. The four strands in each layer are contained in grooves in the top of these plates. The complete saddle is shown in Fig. 2.

Hangers supporting the suspended structure are composed of a single pre-stressed galvanized bridge strand $1^3/_8$ in. in diameter, except that, at the center of the bridge, where the cables are only 3 ft above the center of the truss chords, the eight shortest hangers are each made of two plates $7^1/_2$ in. by 1 in. Each hanger is attached to the cable by means of eight $1^7/_8$-in. plates, which are grooved to fit the strands and are bolted together as shown in Fig. 2. Two of these plates extend below the others in order to provide a connection for the hanger.

TOWERS OF GRACEFUL PROPORTIONS

Design of the towers was studied carefully in order to satisfy the El Salvador government's desire that they should be pleasing in appearance. The tower columns, which have a section $30^1/_4$ in. by $48^1/_2$ in., are fixed at the base. Their outer corners are stiffened by horizontal diaphragms spaced 10 ft apart. Tower bracing consists of a heavy lattice strut at the top and a single panel of diagonals made up of heavy wide-flange beams.

The suspended structure is of conventional type. The floor is divided into 50 panels between the towers. Simple Warren trusses are suspended directly below the cables, and the hangers connect to the verticals at alternate floorbeams. Wide-flange beams were used for all truss members. The depth of truss was made 11 ft 6 in. between centers of chords to insure adequate vertical rigidity, and the trusses were placed outside of the sidewalks to provide the desired lateral rigidity. The ratios of depth-to-length and width-to-length are 1/71 and 1/26, respectively. At no time during or after erection was there any noticeable vibration or undulation of the suspended structure.

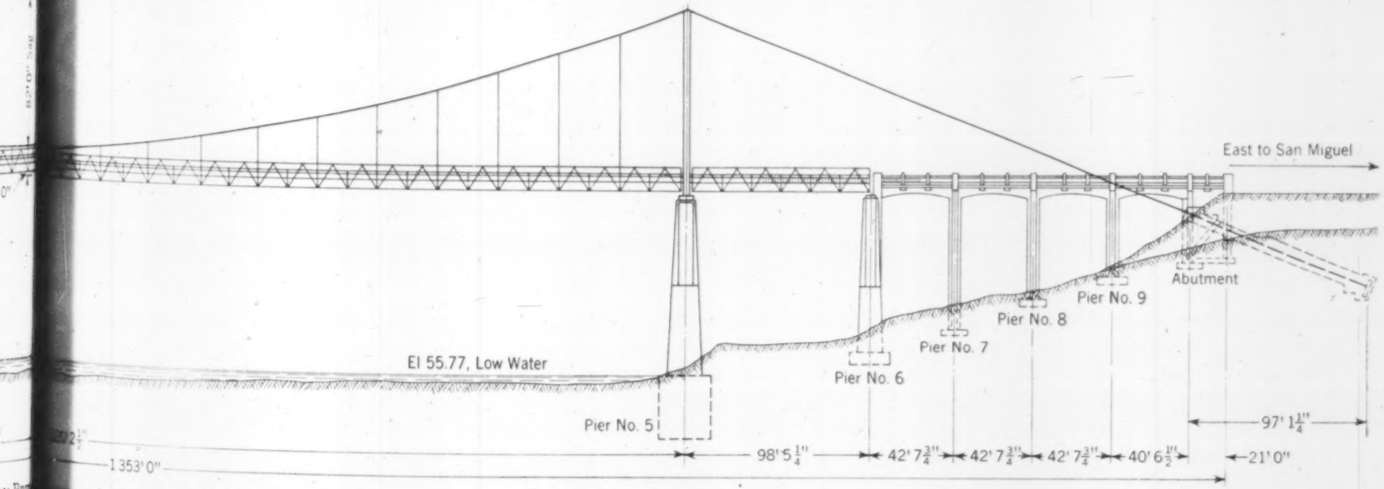


Backstays with Permanent Clamps in Place

Supported on five lines of 16-in. 36-lb stringers, the roadway consists of concrete-filled 3-in. open-grid flooring with a wearing surface composed of an additional $^1/_2$ in. of concrete. A 4-in. reinforced concrete slab is used for the sidewalk.

In a design to resist earthquake forces, the advantage of tunnel anchorages is evident, because they anchor the cables to the rock mass of the earth itself. The principal mass of the bridge is contained in the main-span trusses and floor, and this mass produces the greatest transverse earthquake force on the towers at the level of the trusses. The cables have a small mass but transmit heavy loads to the towers. The earthquake forces on the towers, from the cables, are small. The conservative design of this bridge was not affected by the assumed earthquake forces. It has been shown that the assumed earthquake forces had practically no effect on the design of the San Francisco–Oakland Bay Bridge. (See "Earthquake Stresses in the San Francisco–Oakland Bay Bridge," by N. C. Raab and H. C. Wood, Transactions of the Society, Vol. 106, 1941, p. 1363.)

Because of their length (261 ft and 283 ft, at the west and east sides, respectively), the individual strands in the backstays were put in vibration by even a moderate wind. These strands, which are 4 in. apart at the towers, are spaced 8 in. horizontally and 16 in. vertically, at the sockets. The amplitude of vibration was reduced as the stress in the strands increased, but under dead load it was still too great to be neglected. Two clamps were provided for each backstay, to be erected after the completion of the bridge, at points 0.30 and 0.63, respectively, of the distance from the top of the tower to the anchorage. They were made of bars and U-bolts and



ING Approach Spans and Anchorages

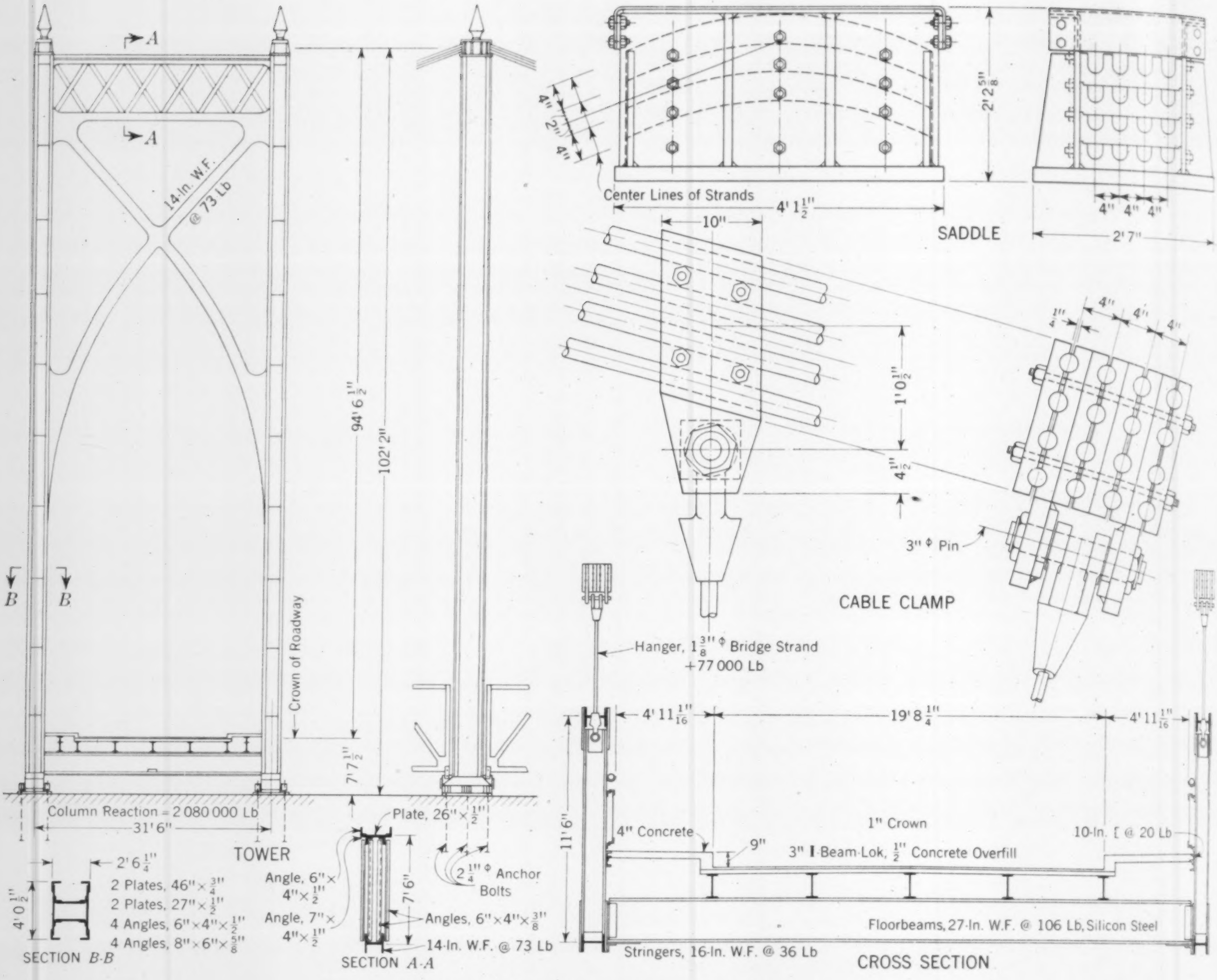

A
A
14-In. W.F. @ 73 Lb
94' 6 1/2"
102' 2"
Crown of Roadway
7' 7 1/2"
B
B
Column Reaction = 2 080 000 Lb
31' 6"
TOWER
2' 6 1/4"
4' 0 1/2"
2 Plates, 46"×3/4"
2 Plates, 27"×1/2"
4 Angles, 6"×4"×1/2"
4 Angles, 8"×6"×5/8"
SECTION B-B
Plate, 26"×1/2"
Angle, 6"×4"×1/2"
Angle, 7"×4"×1/2"
7' 6"
2 1/4" Φ Anchor Bolts
Angles, 6"×4"×3/8"
14-In. W.F. @ 73 Lb
SECTION A-A
4"
2"
4"
Center Lines of Strands
4' 1 1/2"
2' 2 5/8"
SADDLE
4" 4" 4"
2' 7"
10"
1' 0 1/2"
4 1/2"
1/4"
4" 4" 4"
3" Φ Pin
CABLE CLAMP
Hanger, 1 3/8" Φ Bridge Strand
+77 000 Lb
4' 11 1/16"
19' 8 1/4"
4' 11 1/16"
11' 6"
4" Concrete
9"
1" Crown
3" I-Beam-Lok, 1/2" Concrete Overfill
10-In. [@ 20 Lb
Floorbeams, 27-In. W.F. @ 106 Lb, Silicon Steel
Stringers, 16-In. W.F. @ 36 Lb
CROSS SECTION

FIG. 2. DETAILS OF STEEL SUPERSTRUCTURE, CUSCATLAN BRIDGE

were very inconspicuous, as shown in a photograph. The different periods of vibration of the three segments of each backstay have been effective in dampening the objectionable vibration. The single backstay clamps appearing in some of the photographs were used temporarily during erection.

STEEL ASSEMBLY AND QUANTITIES

In appearance and general features of design, the steel flanking spans are similar to the main span. After the concrete piers and approaches were finished, the steel superstructure was erected in the following order: The bottom sections of the towers were placed first. Then the flanking-span trusses were assembled on the ground; each one was hoisted to position as a unit; and the bracing and floor system were filled in. Next the two main towers were completed with a derrick, which traveled up the towers as the tower sections and bracing were put in place. The cable strands were placed and adjusted to proper sag and the cable clamps and hangers were attached. The main-span trusses were assembled on the ground in two-panel units and erected with a trolley system, which was used also in erecting the truss bracing and the floor system. After the bridge was completed, a line of loaded trucks was run over it as a test.

A total of 1,127 tons of structural steel and floor grid, and 188 tons of bridge strands for cables and hangers was used in the superstructure of this bridge. The substructure, approach spans, floor, and sidewalks required 11,575 cu yd of concrete, and 256 tons of reinforcing bars. The cutting edges of the caissons for the two main piers required 17 tons of structural steel.

The contract for the Cuscatlan Bridge was made between the government of El Salvador, Francisco Gallegos, General Purveyor, and the U.S. Steel Export Company, export distributors for subsidiaries of the U.S. Steel Corporation. The American Bridge Company handled the design, fabrication, and construction. The design of the substructure and concrete approaches was made by Modjeski and Masters, consulting engineers, for whom G. H. Randall, M. Am. Soc. C.E., was principal assistant engineer. The steel superstructure was designed in the New York Office of the American Bridge Company under the general supervision of C. F. Goodrich, chief engineer, and J. O. May, engineer in charge of estimating and designing (both Members Am. Soc. C.E.). In general charge of steel erection and all field work was E. G. Amesbury, manager of erection.

Nick F. Helmers, Inc., built the substructure, anchorage tunnels, and concrete approaches, under a subcontract. The American Steel and Wire Company fabricated the bridge strands for cables and hangers and the Carnegie-Illinois Steel Corporation rolled all structural steel and reinforcing bars and fabricated the floor grid.

Testing Theoretical Losses in Open Channel Flow

Part II. Flow Through Bridge Piers

By J. G. Jobes, Assoc. M. Am. Soc. C.E.
First Lieutenant, Corps of Engineers, U.S. Army

and J. H. Douma, Jun. Am. Soc. C.E.
Associate Hydraulic Engineer, U.S. Engineer Office, Los Angeles, Calif.

A NUMBER of formulas are commonly used to compute the losses in flow past bridge piers. The increase in flow depths above those computed for equivalent unobstructed reaches is of prime importance in determining necessary pier and wall elevations. A comparison of computed values with model and field measurements has been made by Lieutenant Jobes and Mr. Douma and is presented in this paper. These experiments have led them to conclude that formulas can be reliably used in design. Part I, treating the subject of superelevation at bends, appeared in the November issue.

TO determine the loss of energy in channel flow as it passes through bridge piers, a number of formulas have been developed and used in design. Those proposed by D'Aubuisson, Nagler, Weisbach, Yarnell, and Rehbock, and the momentum formula developed by Koch and Carstanjen, are probably the most widely applied. Although most of them are based upon experiments covering a limited range of conditions and low velocities, those recommended by Yarnell and Koch and Carstanjen are based upon a large number of laboratory tests covering all classes of flow conditions. Consequently, these were selected by the Los Angeles Engineer District for use in determining the flow line through bridge sections. Flow through any bridge section occurs under one of three classifications. (See accompanying group of three photographs.) Class A flow is defined as a condition in which flow at critical depth through the bridge section is insufficient to produce the energy and momentum required downstream. For this case the flow is tranquil upstream, through, and downstream of, the bridge section, and the upstream depth is dependent upon both the downstream depth and the loss incurred in passing the bridge section.

Class B flow is defined as a condition in which flow at critical depth through the bridge section produces or exceeds the energy and momentum required downstream. When this condition exists, the flow passes through critical depth within the bridge section, and the upstream depth, being controlled by the critical energy and momentum required within the bridge section and the entrance losses to this section, is independent of the downstream depth, which may be either above or below the critical depth.

Class C flow is a special form of Class B flow, which occurs when the upstream flow is rapid and contains sufficient energy and momentum to produce rapid flow within the bridge section. For this case the depth of flow is below critical upstream, through, and downstream of, the bridge section.

FORMULAS FOR BACKWATER AT PIERS

Yarnell based his solution of bridge-pier losses on the energy principle and developed the following involved formula for solution of Class A flow:

$$y_1 = y_3 + H_3 = y_3 + 2K(K + 10\omega - 0.6)(\alpha + 15\alpha^4)\frac{V_3^2}{2g} \quad \ldots\ldots(1)$$

where y_1 is the upstream depth in feet, y_3 the down-

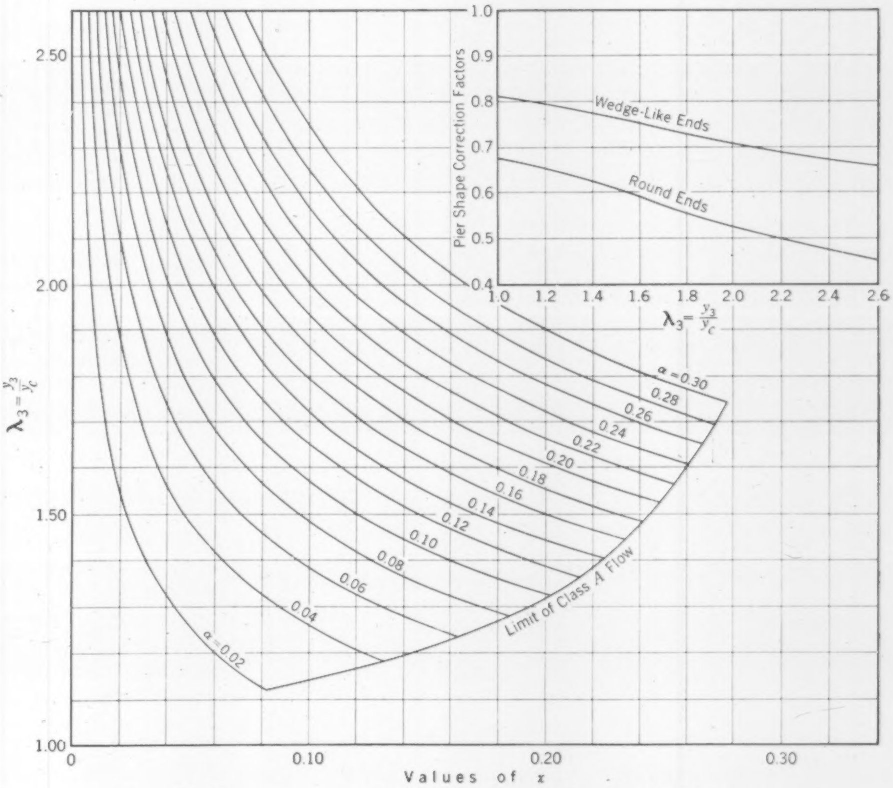
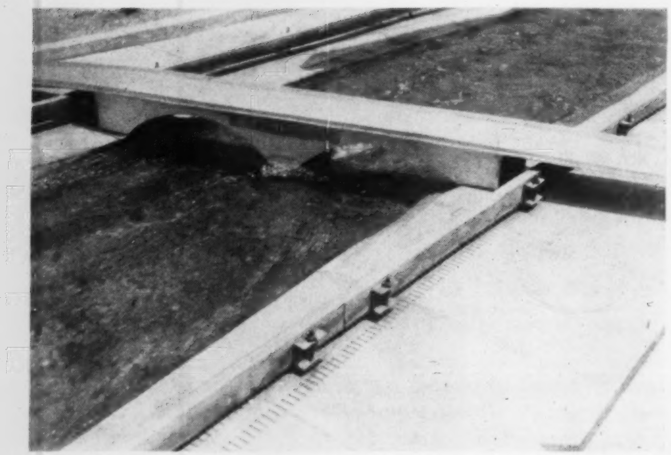


Fig. 6. Solution of Class "A" Flow by Yarnell's Method
(Figs. 1 to 5 Appear in Part I, in November Issue)



DESIGN FLOW OF 104,000 CU FT PER SEC IN LOS ANGELES RIVER MODEL AT NORTH SPRING STREET BRIDGE

stream depth, H_3 the difference in depths upstream and downstream of the bridge obstruction, K an empirical coefficient dependent upon the pier shape, ω the downstream velocity head divided by the downstream depth, α the channel contraction ratio equal to the area of the pier obstruction divided by the unobstructed cross-sectional area of the channel, and $V_3^2/2g$, the downstream velocity head.

For Class B flow Yarnell has developed the formula,

$$y_1 = y_L + C_B \frac{V_1^2}{2g} \quad \ldots\ldots\ldots\ldots (2)$$

where y_L is the "limiting depth," defined as the higher depth in the unobstructed channel, which has flow of equal energy as that required for critical flow within the constricted bridge section; C_B is an empirical coefficient dependent on pier shape and channel contraction ratio; and $V_1^2/2g$ is the upstream velocity head.

None of Yarnell's experiments were conducted for the condition of Class C flow, and therefore he has not developed a formula for this case. He has indicated that his Class B solution might be utilized. This is believed questionable, however, because of the higher velocities with Class C flow.

Koch and Carstanjen based their solution of bridge pier losses on the momentum principle. The general momentum relationship for flow conditions upstream, within, and downstream of a bridge section may be stated as follows: The total upstream momentum minus the momentum loss at the entrance to the bridge section must equal the total momentum within the constricted section; and the total momentum within the constricted section plus the static pressure on the downstream obstructed area must equal the total downstream momentum.

Based on experiments for all conditions of flow, Koch and Carstanjen determined the total kinetic loss due to square-nose bridge piers and solved the momentum relationship to obtain the general momentum equation:

$$m_1 - m_p + \frac{Q^2}{gA_1^2}(A_1 - A_p) = m_1 - m_p + \frac{Q^2}{g(A_1 - A_p)} = m_3 - m_p + \frac{Q^2}{gA_3} \quad \ldots\ldots (3)$$

where the subscripts 1, 2, and 3 represent conditions upstream, within, and downstream of, the bridge section, respectively; p refers to the bridge pier; m is the static momentum in pounds; A the cross-sectional area in square feet; and Q the discharge in cubic feet per second.

The solutions of Eqs. 1, 2, and 3 are simplified by the use of diagrams plotted from the equations. Equation 1, for Class A flow, may be written $y_1 = y_3 + xy_c$, where x is a proportional factor. Values of x were computed from Eq. 1 for several values of α and the ratio y_3/y_c, and were plotted to give the diagram shown in Fig. 6. This diagram permits the upstream depth to be determined when the downstream depth, the critical depth in the unobstructed channel, and the contraction ratio are known. For pier shapes other than square nose and tail, x must be multiplied by the correction factors indicated in Fig. 6.

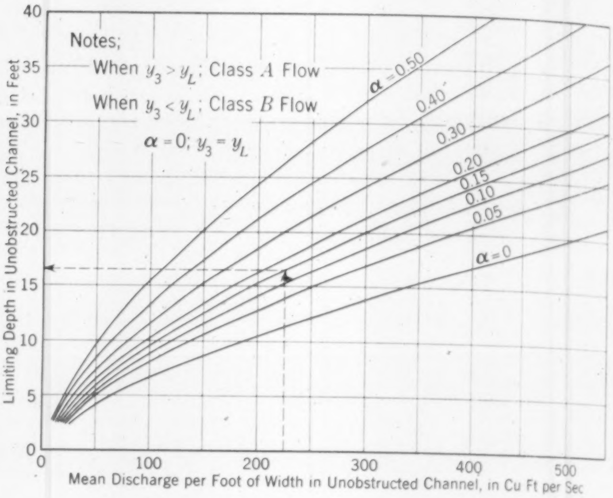
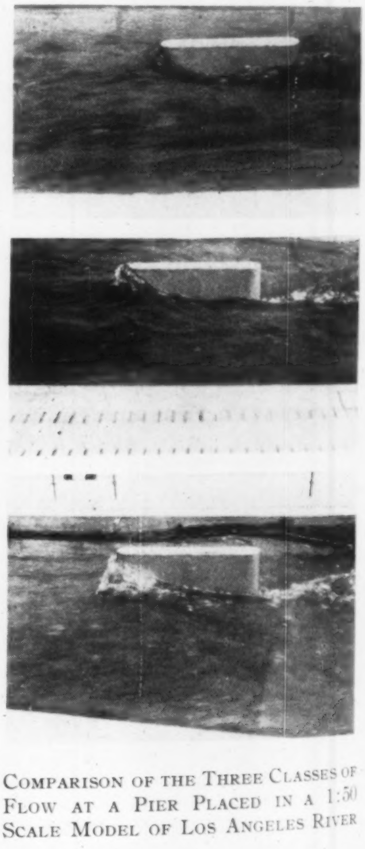


FIG. 7. CHART TO DETERMINE YARNELL'S LIMITING DEPTH D_L

To determine the upstream depth when the flow is of Class B type and the discharge and contraction ratio are known, the limiting depth, as defined by Yarnell, is first determined from Fig. 7. The obstruction loss is obtained from the diagram of Fig. 8 by following the known value of the contraction ratio vertically to the proper pier-shape curve, then horizontally to the value of the upstream velocity head, and finally vertically to the pier loss. The required upstream depth is equal to the sum of the values obtained from the two diagrams.

The diagram of Fig. 7 is also useful for indicating whether the flow is Class A or Class B. When the downstream depth is greater than the limiting depth, the flow is Class A; when less, it is Class B. The solution of Eq. 3 is best effected by plotting each part as



COMPARISON OF THE THREE CLASSES OF FLOW AT A PIER PLACED IN A 1:50 SCALE MODEL OF LOS ANGELES RIVER a function of the channel depth, thereby obtaining three curves representing the momentum of the flow in the sections upstream, within, and downstream of the bridge, respectively.

COMPARISON OF EQUATIONS AND MODEL EXPERIMENTS

To illustrate the classifications of flow at bridge piers, a single pier was placed in a straight reach of the Los Angeles River model, referred to previously, and the channel roughness, downstream depth, and contraction ratio were adjusted to produce the three classes of flow. The general characteristics of backwater, ride-up, and drawdown at piers and the downstream disturbance are shown in the accompanying group of three photographs. Ride-up on the pier nose and downstream disturbance are shown to be least severe for Class A flow and most severe for Class C flow.

Comparisons of upstream depths at the North Spring Street Bridge, as computed by the momentum and Yarnell formulas, and as measured in the Los Angeles River model (shown in a photograph) disclosed satisfactory agreement between computed and measured values. The channel section at the bridge is concrete trapezoidal, having 1 on 2 side slopes, a 160-ft base width, and a single pier 12.5 ft thick. Class B flow conditions existed at this bridge for the indicated range of discharge. For high discharges, there was some impingement of the flow against the bridge arches. Although this was taken into account by increasing the contraction ratio in proportion to the amount of impingement for the computed curves, the model measurements indicate that the loss is not as great as computed.

Field observations taken during the storm of March 2, 1938, at Sawtelle Boulevard Bridge, spanning the improved Ballona Creek channel, present an excellent example of Class A flow. The channel section at the bridge is trapezoidal in shape, having an 80-ft base width and 1 on 3 rock-paved side slopes. The channel obstruction is formed by pile trestle bents spaced 25 ft on centers.

A comparison of the observed pier losses and those computed by the momentum and Yarnell formulas for this bridge shows agreement. The momentum formula gives low values, which is to be expected, inasmuch as this method does not take into account an exit loss occurring just downstream of the bridge. In Class A flow, depths were above the critical, and an exit loss is reflected upstream by an increase in depth; whereas for Class B and Class C flows, the depth at the pier tail was at or below the critical, and any loss was reflected downstream by an increase in depth.

Deviations from the computed curves at the lower discharges probably are due to debris lodged against the upstream face of the square-nose piers. This debris, consisting of tree branches and leaves extending from the invert to an approximate depth of 4 ft, was noted before and after the flood.

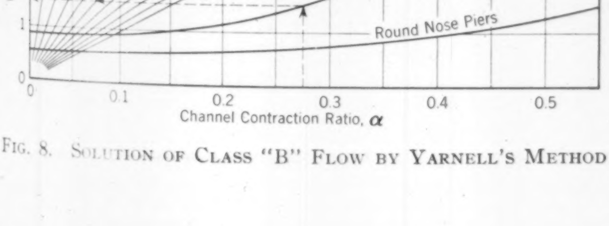
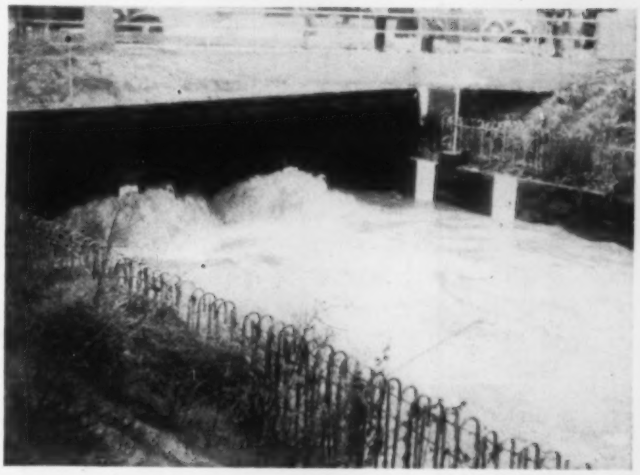


FIG. 8. SOLUTION OF CLASS "B" FLOW BY YARNELL'S METHOD



PIERS OF HAUSER BOULEVARD BRIDGE OBSTRUCTING FLOW IN BALLONA CREEK DURING STORM

Additional data taken during the same flood at Hauser Boulevard Bridge across Ballona Creek presents an example of Class B flow. (See an accompanying photograph.) The bridge section is rectangular in shape with three openings 12 ft wide and two concrete piers 1.35 ft wide.

PIER LOSSES OF MAJOR IMPORTANCE IN DESIGN

In the computation of bridge pier losses, the observed data presented verify within reasonable limits the formulas of Yarnell and Koch and Carstanjen, and show that field conditions may be predicted on the basis of their model experiments. From the comparisons shown it appears that Yarnell's formula is best suited to Class A flow, and that the momentum method is best adapted to Class B flow conditions. While no data are presented to verify the use of the formulas for Class C flow, it is believed that the momentum formula can be used for this case.

The observed data at the Hauser Boulevard Bridge show that under certain critical conditions bridge pier losses can be of major importance in channel design. In this case the bridge presents a channel contraction ratio of only 7%, but the upstream depth is approximately $1^1/_2$ times the downstream depth.

There is generally a scarcity of field data available for use in checking design criteria. In view of this scarcity, it might be well to reemphasize the value of obtaining and analyzing field data whenever possible to determine their correlation with theoretical considerations and model experiments. Wider recognition of this need would result in more practical and safer design criteria.

Acknowledgment for the use of experimental data is made to Dr. Robert T. Knapp, M. Am. Soc. C.E., and Dr. Arthur T. Ippen, Assoc. M. Am. Soc. C.E. Further acknowledgments are made to Capt. J. H. Tyler, Jun. Am. Soc. C.E., and Messrs. A. A. Koch, B. H. Dodge, E. J. Bednarski, Assoc. M. Am. Soc. C.E., and R. F. Wong, who first developed some of the methods of application given here, and to A. P. Gildea, Assoc. M. Am. Soc. C.E., who supervised the experimental measurements and collected the data on the Los Angeles River model. The opinions expressed here are those of the authors and do not necessarily reflect the policies of the U.S. Engineer Department.

Soil Loss on Georgia Farms

Rainfall, Runoff, and Other Factors Are Correlated at Government Experiment Station

By JOHN R. CARREKER

ASSOCIATE AGRICULTURAL ENGINEER, SOIL CONSERVATION SERVICE, U.S. DEPARTMENT OF AGRICULTURE, WATKINSVILLE, GA.

TREMENDOUS losses of earth after heavy precipitation pose a combined agricultural and engineering problem in various parts of the United States. Both phases are being studied to advantage in Georgia with valuable results in correlating rainfall, steepness of slope, and erosion with various crop uses, as here shown. This paper is a revision and amplification of a talk given before the Georgia Section. Mr. Carreker's interesting case studies may be compared to advantage with the more general treatment, "Silt Problems," by Mr. Corfitzen in the November issue.

MEASUREMENT of rainfall and the flow of water has long been of interest to the civil engineering profession. It has concerned itself with determining the rate of flow in streams, the yield of water from given areas of land, the amount of water available for municipal supply, and other problems of water management.

During recent years there has come into existence an activity dealing with the measurement of water characteristics that differs somewhat from those mentioned. I refer to the detailed measurement of rainfall as compared with the resulting runoff and soil loss on farm land. The serious erosion damage on the farms of the nation presents a problem that affects not only all those engaged in agriculture, but the civil engineer in his various fields of endeavor, and society in general.

Soil debris continually clogs navigable rivers, making dredging and other work necessary to keep them open, and fills the channels of smaller streams, causing serious flood damage. Fish production and recreation are hampered because of the poor condition of the streams. Reservoirs fill with erosion debris, and expensive dams and other structures are rendered ineffective. The costs of purifying water supplies are increased. Farmers whose soil has been washed away find their farming enterprises rendered unprofitable.

WHY SURFACE RUNOFF OCCURS

These many ills arise from the fundamental condition that many rain storms have an intensity greater than the rate of water intake into the soil. Under such conditions, surface runoff occurs. With the usual system of agriculture this surface runoff is free to carry loads of soil with it. To control this menace to the security of our farm lands, we must devise systems of farming that either utilize substantially all the rainfall without permitting surface runoff, or reduce runoff rates to non-erosive velocities. Neither of these solutions can be worked out in a short period of time. But definite progress is being made, as will be pointed out.

The Southern Piedmont Soil and Water Conservation Experiment Station, at Watkinsville, Oconee County, Ga., was created January 1, 1937, by the Soil Conservation Service of the U. S. Department of Agriculture, for the purpose of working out a solution to these problems in that area. This station, as shown in a photograph, is situated on hilly land, where the same problems are encountered that confront the farmers of the region in dealing with surface runoff and its accompanying soil losses. Many crops are grown at the station and evaluated for their use in Southern agriculture, with particular reference to their ability to control surface runoff and soil loss. The experimental procedure ranges from the use of small fractional-acre plots to large fields where modern machinery is operated. Cropping practices include the common row cultivation of cotton and corn alone, and in rotation with other crops to provide increased protection to the land, and the use of new protective and soil-improving crops without row cropping.

TABLE I. SOIL AND WATER LOSSES FROM PLOTS WITH DIFFERENT CROPPING PRACTICES—1941

Runoff Is Given in Percentage of Total Rainfall for 1941, or of 40.55 In.

SLOPE, %	LENGTH, Ft	CROPPING PRACTICE	RUNOFF, %	SOIL LOSS, Tons per Acre
3	105	Cotton only	17.8	3.60
3	105	Cotton with balk*	7.6	1.43
7	70	Cotton only	20.7	18.81
7	70	Cotton after lespedeza	11.9	10.67
7	70	Cotton strip 55 ft wide, above kudzu strip 15 ft wide	16.8	3.89
7	70	Cotton with balk*	11.0	2.94
7	70	Oats and lespedeza sown 1st year	25.3	4.73
7	70	Volunteer 2nd year lespedeza	3.9	0.22
11	35	Cotton only	15.4	17.97
11	70	Volunteer 2nd year lespedeza	10.8	1.60
11	70	Volunteer 2nd year lespedeza after straw mulching 1st year	6.0	0.33

* The balk system of cultivation includes an unplowed strip of winter legume between the cultivated cotton rows.

Detailed measurements are made of every rain, including time, duration, and intensity, and of the resulting runoff and soil loss with various crops and ground conditions. Correlations are made between the fundamental relationships of

SOUTHERN PIEDMONT SOIL AND WATER CONSERVATION EXPERIMENT STATION

Nearer Plots Are Without Equipment for Measuring Runoff and Soil Loss

Runoff Plots Equipped with Earth Borders, Metal Concentrating Troughs, Tanks, and Divisor Boxes

rainfall factors, water intake rate, ground-cover condition, and amount of runoff and soil loss.

Small fractional acre plots, with accompanying strategically located recording rain gages, are used for most of these measurements. The plots are adjacent to each other, generally in groups of 6. Three degrees of slope are represented—3, 7, and 11%. The plots are 21.74 ft wide and are, with certain exceptions, 105, 70, and 35 ft long, respectively, on the 3, 7, and 11% slopes. All are equipped with troughs, tanks, and divisor boxes for measuring the quantities of soil and water lost. Five plots are also equipped with rate-measuring flumes and continuous water-level recorders to determine the runoff rate.

Data on water and soil losses collected from plots with different cropping practices for the calendar year 1941 are given in Table I to show the progress being made in soil and water conservation. The low soil loss of 3.60 tons per acre for plots 105-ft long, on a 3% slope, on which only cotton was grown, compared with the high loss of 18.81 tons per acre for the 70-ft, 7% slope plots similarly cropped, shows that the erosion hazard on relatively flat land is not nearly so great as on steeper areas. The soil loss of 17.97 tons per acre on the plots 35 ft long, of 11% slope, planted in cotton only, shows the effect of the method of holding down soil losses on the steeper slopes by spacing the terraces more closely.

Data for the balk plots planted to cotton show that the production of cotton, a clean cultivated crop, can be accomplished with relatively low soil loss by interspersing narrow untilled bands of vegetation, called balks, on the contour. The reduction in soil loss by the use of balks (based on the loss from land in cotton only) is large on 7% slopes, but not so large on 3% slopes, where the protection needed is not so great.

Alternating wide bands of row crops with narrower bands of close-growing crops such as kudzu prevents soil loss from the boundaries of a field, but permits serious movement of soil within the field. In terraced fields, the chief value of this practice lies in providing a close-growing strip immediately above a terrace channel to

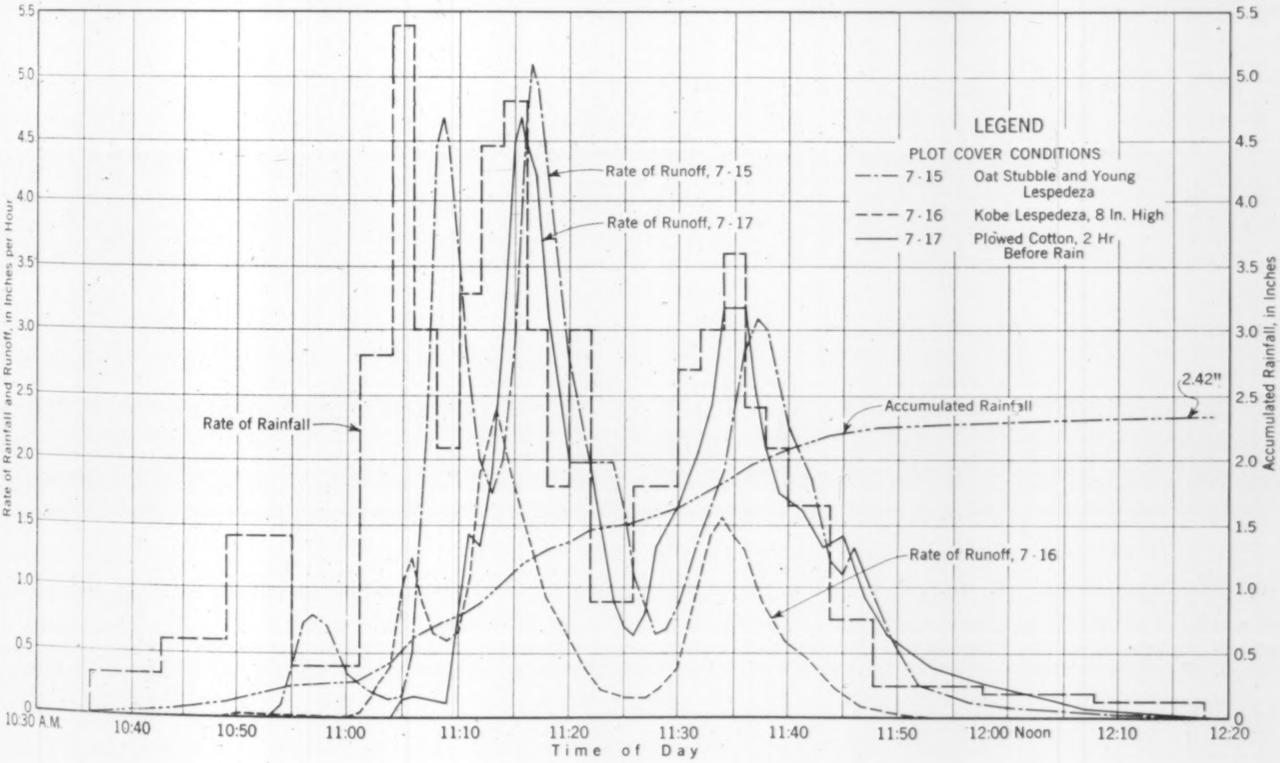


Fig. 1 Hydrograph of July 11, 1941, Rainfall

ARRANGEMENT OF TROUGH, TANKS, AND DIVISOR BOX FOR A RUNOFF PLOT

Recording and Standard Rain Gages in Background

reduce silting in the channel and consequent terrace maintenance work.

The very low soil losses from lespedeza under various treatments and the reduced loss from cotton after lespedeza, indicate that this crop has real value for soil conservation. It provides more efficient use of rainfall as reflected by less runoff, better protection which results in less soil loss, and soil improvement which increases crop yields. Another reason for the superiority of lespedeza in controlling erosion is that its maximum growth takes place in the summer, so that the ground protection is greatest when the most erosive rains occur.

Based on the soil-loss figures for plots entirely devoted to cotton on a 7% slope, 83% of the 1941 annual soil loss occurred during the four-month period from June to September. Rainfall during the summer is of much greater intensity, normally, than that in winter, and the amount of runoff and erosion from a field depend far more on the intensity of the rainfall than on its amount. Analyses of the rates of rainfall and resulting rates of runoff from selected plots illustrate this fact.

For a rain on July 11, 1941, Fig. 1 shows the accumulated amount of rainfall in inches, the rate of rainfall in inches per hour, and the rate of runoff in inches per hour from three plots. The plots were all on a 7% slope, 70 ft long, and one-thirtieth of an acre in size. They represent a three-year rotation of cotton, oats and sown lespedeza, and volunteer second-year lespedeza.

PLOWED GROUND ABSORBS LIGHT RAIN

This rain of 2.42 in. contained three distinct peaks of relatively high intensity. From the oat stubble and young lespedeza on Plot 7–15, runoff began soon after the rain started, and the runoff rate was almost equal to the rainfall rate. The thick stand of second-year volunteer lespedeza on Plot 7–16 allowed practically no runoff for the first period of high rainfall rate, and for the other two periods the rates of runoff were approximately only half the rainfall rate.

The freshly plowed cotton plot, which had been planted to lespedeza the preceding year, was able to absorb all the rainfall throughout the first period of high intensity, but during the two periods that followed, rates of runoff almost equaled the rainfall rates. These rates, with the resulting amounts of runoff of 1.64 in. for the oat stubble, 1.14 in. for the cotton, and 0.65 in. for the lespedeza, reflect the comparative efficiency of these crops as aids in storing rainfall. This relative efficiency is reflected on an annual basis in the column for percentage of runoff in Table I.

Comparative soil losses for this rain are of considerable interest. Even with so high a rainfall rate and with runoff amounting to 27% of the rainfall, the complete ground cover on the lespedeza plot (7–16) permitted no appreciable soil loss. The hard-crusted ground condition following oats on Plot 7–15 permitted a rate of runoff nearly equal to the rainfall rate throughout the storm, giving a runoff volume of two-thirds of the rainfall. Even with this relatively inefficient use of the rainfall, the soil loss was low compared with the losses from land in cotton, as only 1.25 tons per acre were lost from the oat stubble during this rain.

The loosened condition of Plot 7–17, in cotton, permitted infiltration at a rate high enough to absorb all the rainfall through the first period of high intensity. The relatively high rates of runoff later, however, caused severe erosion damage because of the lack of protective cover on the land. The soil loss of 5.49 tons per acre represented half the loss for the entire year from this plot. During the year many rains of shorter duration or lower intensity were completely absorbed because of the loosened condition of this ground.

Hydrographs and other data of similar nature show that for rains of long duration and relatively low intensity, typical of most winter storms, fluctuations in runoff rate follow fluctuations in rainfall, indicating a direct relationship between rate of rainfall, intake of the soil, and runoff. The low total soil losses from rains of this type are a direct reflection of the low rainfall and runoff rates. Very low soil losses from lespedeza again indicate the protective ability of this crop.

Complete data covering single rains for the calendar year 1941, are indicative of the possibilities of applying control measures under field conditions to prevent excessive water and soil losses. Such measures properly and widely applied can be used as a basis for developing a system of agriculture that will have a widespread and beneficial effect. A greater use of lespedeza on the croplands of this section would notably reduce rates of runoff, and would thereby materially affect flood flows in streams fed from these fields. A higher intake of water into the soil would result in a more even spring flow and would maintain streams at higher and more uniform levels over longer periods of time. Likewise, better soil moisture conditions would prevail on the farm land itself during periods of drought.

FLUME AND WATER-LEVEL RECORDER FOR MEASURING RATE OF RUNOFF FROM A PLOT

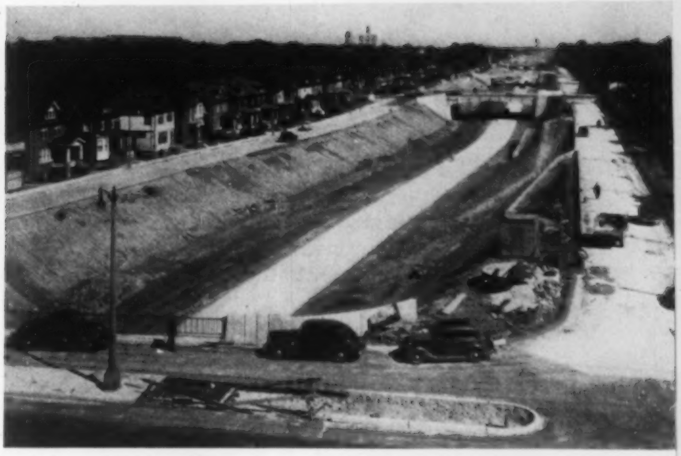
Reduced soil losses would prevent the destruction of many uses of our streams, would help maintain the fertility of farm land, and would result in better economic cond tions for rural communities.

Davison Limited Highway, Wayne County, Mich.

Part I. Planning to Expedite Crosstown Traffic

By Harry A. Shuptrine *and* Julian C. Mead
Members Am. Soc. C.E.

Respectively Bridge Engineer and Chief Bridge Designer, Board of County Road Commissioners, Wayne County, Mich.



View of Highway Where It Passes Through Compact Residential and Commercial Section of Highland Park, Mich.

Ever-increasing street traffic in the Detroit area has brought about congestion which has wasted many hours in the transportation of war materials. The Board of County Commissioners, with the cooperation of the city of Highland Park, seized upon this opportunity to construct a crosstown limited-access highway, the first of its kind in the nation's motor capital. Messrs. Shuptrine and Mead have prepared a second paper on the design and construction of this project, which will be presented in a forthcoming issue.

Detroit, the center of the automobile world, has grown by leaps and bounds with the expansion of the automotive industry and has come to rely upon that form of transportation to a greater degree perhaps than any other populous center in the world. It is without elevateds, subways or suburban train service and has only a comparatively limited surface street-car system supplemented and extended by buses. With its industries spread into every corner of the metropolitan area, its workers are largely dependent on the automobile, as there is no adequate form of mass transportation. Many of its industrial plants are so located as to be largely dependent on motor trucks for the transportation of parts, automobile bodies, and other products from factories to points of assembly.

CONGESTION PROBLEM IN DETROIT

While the development of the highway system in the outskirts and beyond the limits of the city has kept pace with present needs and has provided rights of way sufficient for the future, the problem of correcting conditions in the congested core of Detroit is only in process of solution. Beyond a semicircle based on the Detroit River, with its center at Woodward Avenue and approximately a $6\frac{1}{2}$-mile radius, the Master Plan provides that all diagonals and arterials have superhighway rights of way 204 ft wide. In the gridiron of north-and-south and east-and-west streets and roads, the right of way of all section-line thoroughfares beyond that area is required to be 120 ft wide, except that at 3-mile intervals a superhighway width of 204 ft is provided. The half-mile roads are planned to be 86 ft wide. Through the operation of platting laws and condemnations, this system is now largely an accomplished fact.

Within the semicircle, the major relief afforded in the past ten years has been through the widening of many of the main arteries. The main radials from the heart of Detroit have been the first consideration, and at great expense they have been widened—generally to 120 ft.

To reduce accidents and congestion and to increase traffic capacity, street widenings in the heart of the city have been supplemented by the establishment of one-way streets, elimination of left turns from certain arteries, and traffic-light control, thereby attaining nearly maximum use of the available surface street system. In Detroit as in other large and congested cities, however, surface facilities alone cannot solve the problems of congestion, requisite safety, and volume and speed of traffic. It is also necessary to provide non-stop limited access highways, strategically located with respect to traffic routes to carry major traffic movements and distribute them to various centers and arteries. The Davison Limited Highway is the first project of that type to be placed under construction in the Detroit metropolitan area.

Highland Park, with a population of 50,000, is entirely surrounded by the city of Detroit, as is shown in Fig. 1, and is centrally located in the metropolitan area about five miles out Woodward Avenue north from the hub of Detroit. Woodward Avenue is the "main street" of Detroit and Highland Park, and bisects the latter. With the three adjacent streets on each side, it carries the major part of the north-and-south traffic of Detroit. This is the direction of heaviest traffic flow in the metropolitan area.

Industrially, Highland Park is important, but the major part of the city is a middle-class residential section, and most of the industrial employees are drawn from Detroit and vicinity.

The development of Highland Park as a residential city was coincidental with that of the Ford Motor Company, whose original plant was there. Then came the rapid expansion of the city of Detroit, which reached out around and beyond Highland Park.

STRATEGIC POSITION OF HIGHLAND PARK

Highland Park straddles the seven main north-and-south streets of the city of Detroit—from west to east, Hamilton, Third, Second, Woodward, John R., Brush, and Oakland. Three streets—Hamilton, Woodward, and Oakland—carry street cars.

The crosstown (east-and-west) street system is the typical hit-or-miss arrangement of narrow residential streets (over thirty in all), growing out of early uncontrolled subdivision activities, and not a single street is without a jog or two in the $1\frac{1}{2}$-mile width of the city. None have a continuous width greater than 60 ft, and practically all are limited at some point to 50 ft.

The $1\frac{1}{2}$ mile-long easterly boundary of Highland Park is bordered by the Grand Trunk Western Railroad, just east of and parallel to Oakland Avenue. Most of the crosstown streets come to a dead end at Oakland, and only three cross the railroad to reenter Detroit—Six Mile Road at its northerly limit, Davison centrally located, and Connecticut near its southerly limit. On the other hand, some 32 streets of the city of Detroit enter Highland Park at its $2^{1}/_{4}$-mile-long westerly boundary.

Thus, for this two-mile-wide belt of east-and-west Detroit traffic, Davison Avenue is the only intermediate outlet across Highland Park. Before this project was initiated, it was a 60-ft residential street with 32-ft pavement and with jogs at Woodward and Oakland avenues. The Board of Road Commissioners of Wayne County had previously taken over Davison Avenue on each side of Highland Park and had widened it to 120 ft, constructing an adequate grade separation under the Grand Trunk Western Railroad. This was a good start toward the solution of the problem of an adequate artery across the city.

After several years of negotiation between that Board and Highland Park, jurisdiction over Davison Avenue was turned over by the latter to the Board in April 1941, to proceed with the project, it being specifically understood that loss of property from the city tax rolls would be minimized by condemning only a half block of property, extending from Davison to the alley south of it. This altogether provided a right of way of 205-ft maximum width for the project. Because of variations in street lines, this right of way is somewhat narrower adjacent to Woodward and Hamilton avenues. Thus was set up the first stringent limitation on the design of the project.

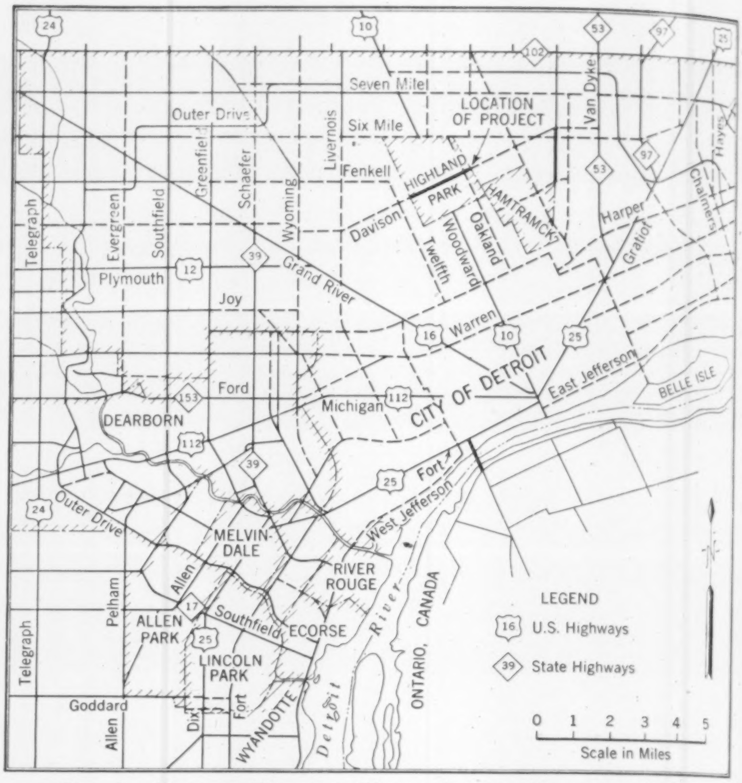

24
10
53
97
25
102
Seven Mile
Outer Drive
Six Mile
LOCATION OF PROJECT
Van Dyke
Hayes
Fenkell
HIGHLAND PARK
HAMTRAMCK
53
97
Telegraph
Evergreen
Southfield
Greenfield
Schaefer
Wyoming
Livernois
Davison
Twelfth
Woodward
Oakland
Harper
Gratiot
Chalmers
12
39
Plymouth
Grand River
Joy
16
Warren
10
25
CITY OF DETROIT
East Jefferson
BELLE ISLE
Ford
153
DEARBORN
Michigan
112
112
39
25
Fort
24
Outer Drive
West Jefferson
MELVINDALE
RIVER ROUGE
Allen
Pelham
17
ALLEN PARK
25
Southfield
ECORSE
Detroit River
ONTARIO, CANADA
LINCOLN PARK
Telegraph
Goddard
Allen
Dix
Fort
WYANDOTTE
N
LEGEND
16 U.S. Highways
39 State Highways
0 1 2 3 4 5
Scale in Miles

FIG. 1. DAVISON HIGHWAY, WHICH CARRIES HEAVIEST CROSSTOWN TRAFFIC OF HIGHLAND PARK, MICH.

The Davison Limited Highway, which crosses the city of Highland Park from west to east, is a typical example of the solution of traffic problems in congested areas by fully depressing a through artery. First contracts were let in the summer of 1941, and the project was opened to traffic in November 1942.

FUNCTION OF DAVISON LIMITED HIGHWAY

Although the project extends only some 7,000 ft in length, it a self-contained and complete unit, functioning to expedite traffic through an area the streets of which have heretofore been a partial barrier to crosstown traffic in the Detroit metropolitan area. It also enables the remainder of this reasonably commodious and extensive crosstown industrial street to be utilized to capacity. The project crosses seven of the heaviest traveled north and south streets of the metropolitan area and attracts crosstown traffic which formerly taxed to capacity many adjacent narrow residential streets, on which over 90% of the traffic was through traffic. Through the removal of this crosstown traffic from the many intersections involved, the local capacity of each of these seven arteries is also materially increased.

In July of 1940, a 14-hour traffic count was made between the hours of 7 a.m. and 9 p.m. at the seven intersections covered by the Davison Limited Highway Project and at several other intersections as far away as Wyoming Avenue, three miles to the west. A typical diagrammatical presentation of the results for the seven intersections is presented in Fig. 2. It should be borne in mind in reviewing this diagram that much of the traffic now using the project was formerly dispersed over residential streets parallel to Davison, or else avoided the entire area by traveling much greater distances, using Six Mile Road or other routes.

During the period of peak traffic on the seven north-and-south streets, which coincides with peak periods on Davison Avenue, the interference to cross traffic was so great that Davison Avenue was often loaded with stalled traffic from Third to Oakland, and under this saturated condition the overflow affected many parallel residential streets. Incidentally, the traffic on the seven north-and-south streets, which totaled 105,000 vehicles for the 14-hour period, was seriously impeded by this congestion of cross traffic.

It will be noted that the 14-hour count showed that the crosstown traffic of Davison Avenue at all seven intersections was quite uniform at from 15,000 to 16,000 vehicles, and that at each intersection all turning movements were generally considerably less than 10% of the total. Much of the traffic involved in such turning movements was of purely local significance and had no need to be served by the limited features of the project. It is now adequately and better served by the local service drives.

The 14-hour traffic count on Davison Avenue at the Dexter Avenue intersection, $1^{1}/_{2}$ miles west of the project, is 25,000, which is a partial indication of the much larger

CURVED WING WALLS ON HAMILTON AVENUE BRIDGE PERMIT SERVICE-DRIVE TURNS volume of traffic which will utilize this route. At that point Davison Avenue is paved 80 ft wide on a 120-ft right of way. It was estimated that crosstown traffic using the Davison Limited Highway would soon reach 35,000 or 40,000 a day, but it is foreseen that this volume will not be reached under gas rationing.

It is anticipated that in the future other improvements will be made in the Davison Avenue crosstown artery, which will greatly increase its usefulness and its traffic capacity. It is possible that the limited section will be extended. It is probable that west of Wyoming Avenue an adequate right of way will be provided as far as Grand River Avenue, where it meets Schoolcraft Avenue, which is a 204-ft superhighway west of Detroit. Similarly, to the east of the project, it is probable that greater adequacy will be provided at least as far as Mound Avenue, which is a 204-ft superhighway extending north from Detroit.

In planning the present project, however, it was quite clear that under the existing conditions no advantage could accrue to traffic, commensurate with the cost involved, through a purely surface development of wider right of way and pavement for Davison Avenue from Hamilton to Oakland. To reap any material advantage it was necessary that the grades be separated at each of the seven crossings and that local traffic on Davison be segregated from through traffic. Since these crossings are from 700 to 900 ft apart, a continuous limited highway was obviously indicated.

TWO SEPARATED LANES PROVIDED

The beginning of the west approach is at Lincoln Avenue, and the project extends to a point some 800 ft east of Oakland Avenue. The limited-access characteristics carry on another 1,000 ft to Greeley Avenue, which lies east of a grade separation under the Grand Trunk Western Railroad and which is the first cross street east of Oakland Avenue. Thus Davison Avenue will be a limited-access route for 8,000 ft.

West of the project, Davison Avenue, through widenings previously made, is 120 ft wide to an important artery, Wyoming Avenue, a distance of 3 miles. In that section it crosses two major arteries. East of the project it is one of the few continuous crosstown routes of any degree of adequacy, and near its easterly end it meets Mound Superhighway (204 ft wide), which is the main outlet serving the area north of Detroit.

The Davison Limited Highway itself, as shown in Fig. 3, consists of two 33-ft unreinforced concrete pavements 10 in. thick, depressed from 12 to 17 ft below an almost level terrain. The median strip, 6 ft wide, is occupied by a barberry hedge except under and adjacent to bridges, where it is paved. Except where local details or width limitations required the use of retaining walls, this roadway is flanked on each side by the side slopes of the cut and by a local, one-way concrete service drive and sidewalk at the grade of the former avenue. In general, these side slopes with berms each occupy a strip 35 ft 6 in. wide, and each local roadway utilizes the outer 31-ft strip of the right of way.

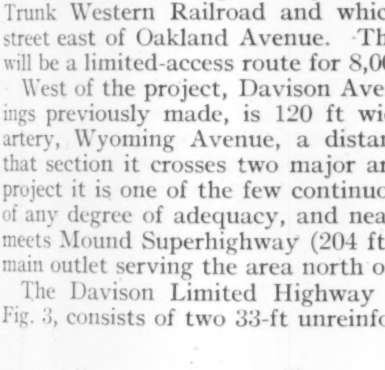
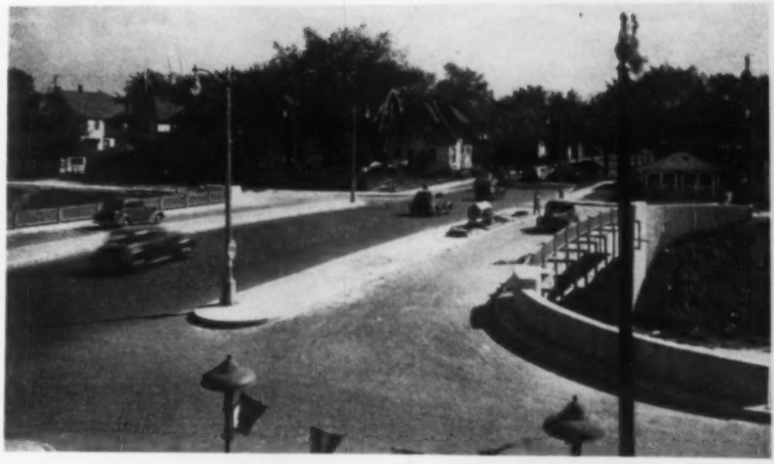


Fig. 2 Traffic Count at Woodward-Davison Avenue Crossing, Before Construction of Express Highway



Roadway of Third Avenue Bridge Showing Service Drives, Provided on All Bridges

Each of the seven streets crossing the project is carried over the depressed section on a reinforced concrete bridge of rigid-frame design. The three carrying street-car tracks are two-span bridges, while the others are a single span of 77-ft 4-in. clear length. The clear-span lengths of the two-span bridges are 37 ft 2 in. at Hamilton and Oakland avenues and 42 ft 6 in. at Woodward Avenue. The minimum clearance at certain bridges is 13.2 ft adjacent to the curb of the median strip, but over the central lane of each roadway it is at least 14 ft 8 in. in all cases.

PUMPING FACILITIES AND SERVICE DRIVES

Provision is made in the width of all bridges outside the 10-ft walks for a 15-ft connecting drive to accommodate the U-turns between the one-way service drives, so that local traffic in making such turns will not have to enter the cross street. The outer curb and fascia of the bridge follow a compound curve of the necessary inner radii for such U-turns. At Hamilton and Oakland avenues only one U-turn is provided for; at all others, two. The width of through paving on the bridges is the same as on the present streets except that a minimum of 40 ft is maintained on the 60 ft streets, where previous paving was less than 40 ft. The widest bridge is at Woodward, with an over-all width of 137 ft 8 in.

To avoid direct connection to city sewers located just below grade, and the possibility that the depressed highway will be flooded by back pressure, the drainage system is served by four pump houses at Hamilton, Second, Woodward, and Oakland avenues. The installation includes some eleven 2,500-gal per min centrifugal pumps, which discharge well above these city sewers to provide flow back into them. The section of the drainage system flowing to each pump house is connected to the next adjacent system to secure a maximum use of the pumping capacity and to insure against breakdowns.

For the safety of traffic using the service drives, an 8-in. curb is provided along each of these drives, at the top of the slope of the cut for the depressed highway. In the berm between this curb and the top of the slope, 36 in. back of the curb, additional permanent protection will eventually be installed. As a temporary expedient which does not involve the use of critical materials, cedar posts will be placed on 5-ft centers, to project approximately 26 in. above the curb.

The depressed highway will be appropriately landscaped throughout. All slopes have been sodded, and trees

PLEASING SIMPLICITY MARKS ARCHITECTURAL TREATMENT OF SINGLE-SPAN RIGID FRAME OF THIRD AVENUE BRIDGE

will be planted along the upper berms, intermingled with shrubs which will extend part way down the slopes. Both the depressed highway and the service drives are adequately lighted, the lights in the depressed sections being located back of the rolled curbs at the toe of the slope of the cut.

The only access to the depressed section of the highway is at the two ends of the project, since well over 90% of the traffic served is through traffic. At the Woodward Avenue Bridge (approximately at the middle of the project) provision is made, however, for interchange of bus passengers between the two levels. At this point an additional 10-ft lane is provided in each depressed roadway for a bus stop in advance of the bridge. To complete this pedestrian interchange, there are stairways in each of the four quadrants, and a sidewalk under the bridge along each depressed roadway.

Except adjacent to Hamilton and Woodward avenues, the right of way for the project is 205 ft wide and was secured by condemning the half block to the south, between Davison Avenue and the alley. This involved the moving of some 63 residences (many of them two-family flats) and the razing of 69 buildings, including a few business structures. The cost of the right of way, including all items, was about $1,450,000, and the construction cost, including all overhead and other expenses, will total about $2,130,000.

PREPARING THE PROGRAM FOR THE PROJECT

In April 1941, the general features and limitations of the project were agreed to by the city of Highland Park, and the Board of Road Commissioners of Wayne County was enabled to proceed with the work. Only an outline plan had been prepared; no detailed surveys had been made: and condemnation of the right of way had not been completed

The necessity for adopting a program that would insure completion of the project in 1942 was apparent.

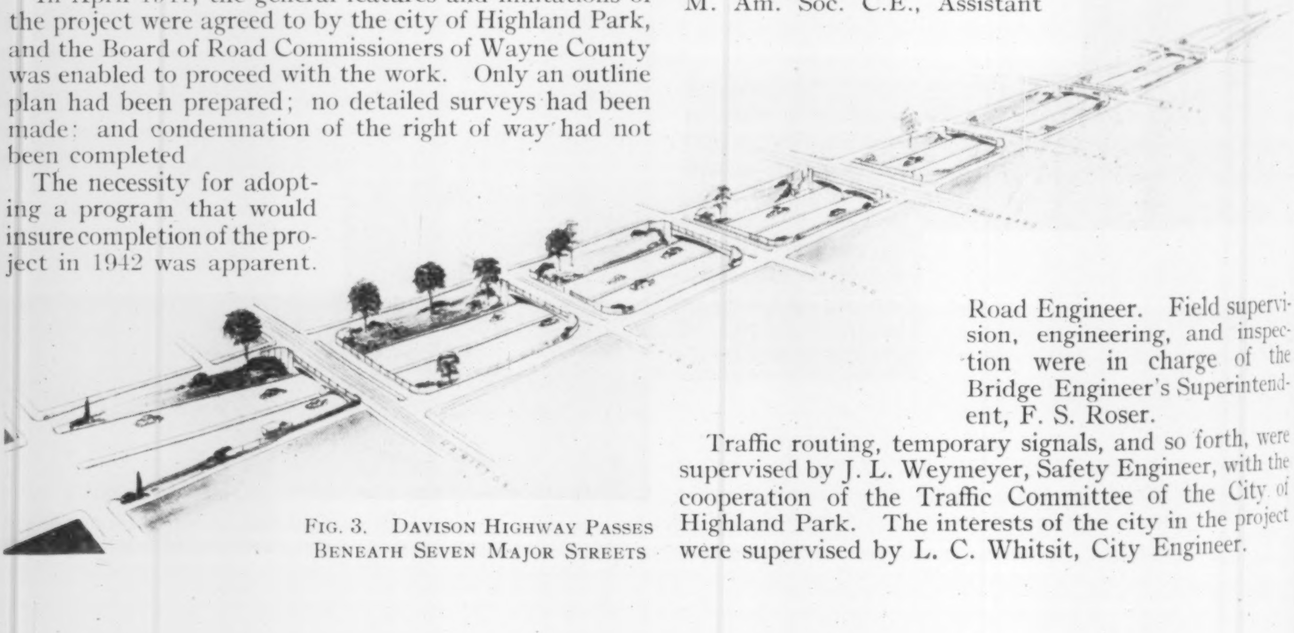


FIG. 3. DAVISON HIGHWAY PASSES BENEATH SEVEN MAJOR STREETS

It was also evident that the program must be such as to insure a minimum of interference with the heavy street and street-railway traffic involved, and to permit continuity of service in the many underground utilities affected. It was determined that the relocation and reconstruction of underground utilities must proceed immediately, so that the construction of the four single-span bridges at the intermediate streets not occupied by street-car lines could be initiated in 1941, and the heavy construction done in 1942.

With the outline plan and typical structural details as a basis, a rapid series of conferences were held with all agencies having to do with street and electric railway traffic and public utilities. In this way the controls on the design of structures and on the program of construction were soon determined and details agreed upon.

It was also apparent that, with the growing shortage of critical materials, long delays could not be avoided unless such materials and all mechanical and electrical equipment for the whole project were purchased before the construction contracts were let, for delivery to suit construction needs. Accordingly, as rapidly as sufficiently accurate details became available, all such materials were purchased. Many of these purchases were made before priorities were instituted, and thus the A-4 priority rating given the project proved adequate.

The preparation of detailed plans and specifications kept pace with the requirements of this program, and the work was accordingly let in nine separate contracts. Street-lighting facilities were installed by the Detroit Edison Company, and privately owned utilities were rerouted and reconstructed by their owners. Work by county forces included all temporary paving, all sodding, and provisions for detouring traffic, such as temporary signal and other lights and the construction of a street-railway trestle at Hamilton. The Department of Street Railways assumed responsibility for all track work and its overhead power supply.

This project was built under the jurisdiction of the Board of County Road Commissioners of Wayne County and under the general supervision of Leroy C. Smith, County Highway Engineer; John K. Norton, Road Engineer; and Harry A. Shuptrine, Bridge and Grade Separation Engineer, all Members Am. Soc. C.E. Plans, specifications, and proposals for the entire project were prepared in the design room of the Bridge Division, under the direct supervision of the authors, assisted in regard to paving by Paul Holland, M. Am. Soc. C.E., Assistant Road Engineer. Field supervision, engineering, and inspection were in charge of the Bridge Engineer's Superintendent, F. S. Roser.

Traffic routing, temporary signals, and so forth, were supervised by J. L. Weymeyer, Safety Engineer, with the cooperation of the Traffic Committee of the City of Highland Park. The interests of the city in the project were supervised by L. C. Whitsit, City Engineer.

Moving a Coal Bridge

Enlargement of Canadian Storage Yard Necessitates Relocation of 475-Ton Structure

By D. C. TENNANT, M. AM. SOC. C.E.
ENGINEER, DOMINION BRIDGE COMPANY, LTD., TORONTO, CANADA

WHEN faced with the task of serving a new coal and coke storage area with a traveling bridge from another yard, a large Canadian steel corporation decided to jack up the bridge and move it rather than dismantle it and erect it again in the new location. Mr. Tennant describes the method and equipment necessary for this unusual job. His paper was originally given before the Structural Division at the Society's Niagara Falls Meeting, held jointly with the Engineering Institute of Canada.

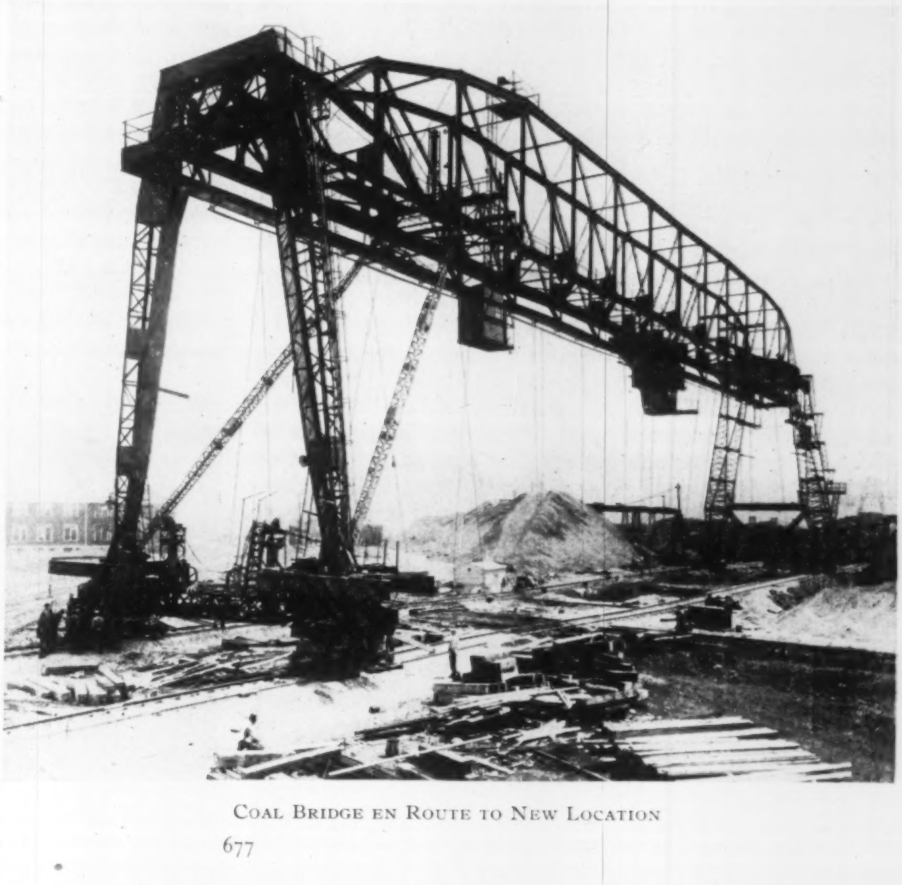
IT is obvious that the war has greatly accentuated the demand for steel, and nowhere are the resulting problems so acute as at the steel-producing mills themselves. At a large Canadian steel corporation it has become necessary practically to double the size of the coal and coke storage area. The present yard, 300 ft wide and 1,600 ft long, is fed by railway coal cars traveling on a steel trestle about 25 ft high, which runs longitudinally through the middle of the area. Two traveling coal bridges run on longitudinal rails and span 300 ft transversely.

These bridges are supported at a clear height of 55 ft on a shear leg at one end and a pier leg at the other. The pier leg is splayed out sufficiently at the top to give stability to the structure and so resist tractive forces from the bucket trolley, while the shear leg is merely a bent supporting the other end of the bridge and capable of a certain amount of movement at the bottom to take up inequalities in track level or gage.

It was decided to increase the coal storage area by providing another similar yard about 900 ft to the north of the first one. The plan was to leave one of the bridges to serve the old yard and to transfer the other to serve the new yard at a slightly higher elevation. This would necessitate the building of new tracks for the transferred bridge, with the necessary concrete foundation walls to support them. The old and new tracks are level throughout their length, but the new yard and its tracks are 8 ft $4\frac{1}{2}$ in. higher than the old. Moreover, the alinement of the new tracks makes a small angle of $3^\circ 15'$ with the old.

Two possible ways of moving the bridge presented themselves: either it could be dismantled and reerected in its new position, or it could be moved along the ground without dismantling. The second alternative was chosen as being cheaper and quicker, and was outlined in the agreement with the Dominion Bridge Company of Toronto. Both pier and shear legs were to be jacked up enough to allow railroad trucks to be inserted under them. These trucks were to run approximately at right angles to the ordinary direction of operating travel, on standard-gage tracks laid by the steel corporation. Slag ballast and fill were to be placed at a constant grade to bring the bridge to the level of the higher new yard and at a constant slight curvature to take care of the $3^\circ 15'$ difference in alinement of the permanent yard tracks. When the bridge reached its final site it was to be jacked again, the trucks removed, and the structure brought to rest on the permanent rails. This method is obvious enough in principle, but no similar structure had ever before been so transferred in Canada, and we know of no very close precedent elsewhere.

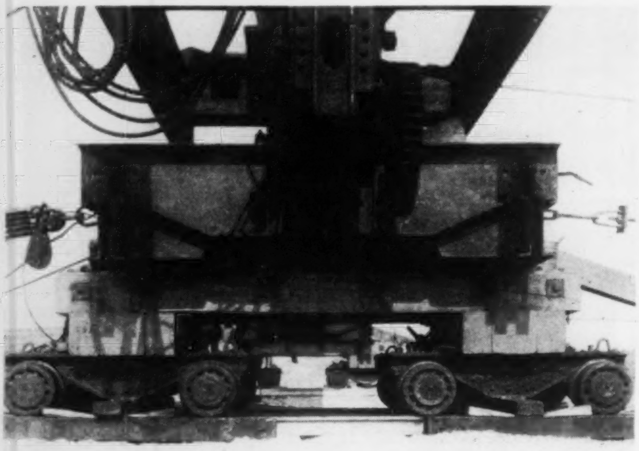
The total weight of the bridge, including coal carried in the bucket, was stated, on available plans, to be 475 tons, and an independent check of the weights from the shop drawings showed this to be well on the safe side. The pier leg is actually wider at the bottom than the shear leg. The difference in spread is 1 ft $9\frac{3}{4}$ in., or $10\frac{7}{8}$ in. on each side of the center line of the bridge. As it was desirable that the trucks under both shear and pier legs should run on the same temporary tracks, these tracks were laid at a distance of 41 ft $4\frac{7}{8}$ in. apart center to center, determined by the average of the two gages. Two railroad trucks, each of four wheels, were used under each pier and shear corner. At the pier corners, a standard 75-ton and 50-ton truck were used, and at the



COAL BRIDGE EN ROUTE TO NEW LOCATION

shear corners were two 60-ton special trucks such as are placed under locomotives when they are being repaired. The standard trucks had 33-in. wheels, while the wheels on the repair trucks were much smaller but at the same time very strong.

The 75 and 50-ton tandem arrangement would take care of a reaction of 125 tons, or 250 tons for the whole pier end. The stretchers distributing to the trucks were loaded at the three-fifths points so that the heavy truck would get three-fifths of the load and the light one two-fifths. The repair trucks were much lower in height and had to be built up with heavy timbers, as shown in a photograph. The capacity of each truck was 60 tons, making 120 tons at each corner, or 240 tons for the whole shear-leg end.



CARRIAGE AND CRIBBING AT SHEAR LEG
Note Connection for Pulling the Bridge at Left

MOVING PROCEDURE FOLLOWED

Trucks of different sizes were used because they were the best available and were capable of carrying the loads. The rails used for the temporary track were of 85-lb A.S.C.E. section. The trucks were spaced 11 ft 3 in. apart longitudinally center to center at the pier end, and 9 ft apart at the shear end. The stretchers to distribute the reaction from the leg to the trucks were two 24-in. beams at 79.9 lb per ft.

Cribs of heavy wooden timbers were built as the bridge was jacked up. These cribs were outside the temporary track width and carried four 50-ton hydraulic jacks at each corner. These jacks supported the four ends of two transverse beams 20 ft long (24-in. at 104.5-lb), into which were headed double 18-in. channels, at the center of which angle ties were riveted to connect to the tops of the main gussets or box girders that formed the bases of the legs. The shear legs were raised about a foot, then the jacks were moved to the pier leg, and it was raised an equal amount. Thus by alternately jacking the two ends, the necessary clearance was obtained. In the old yard the ground was well compacted and very little settlement under the jacks could be noted. In the new yard some ground was softer, so concrete foundations were provided at the jacking points.

The bridge was moved by pulling uphill at the base of the shear leg. To distribute the force necessary to move the bridge 860 ft to the new tracks, the bottom of the shear leg was braced to the second bottom-chord joint of the bridge. This arrangement is shown in an accompanying photograph.

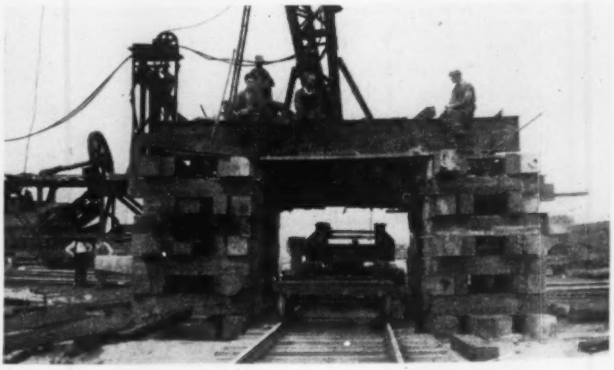
These two temporary bracing members were derrick boons with adapters at each end to take either tension or compression. Also $1^1/_2$-in. threaded rods were stretched between the bottoms of the shear and pier legs. These were in 30-ft lengths, connected together with homemade turnbuckles, and suspended from the truss above at several points by wire-rope hangers to prevent sag. During pauses in the movement of the bridge, several lengths of these tie rods could be readily removed if necessary to allow track or road traffic to pass under the bridge. In such cases the trucks were first wedged in position so that they could not move on the temporary tracks.

It was assumed that possibly a pull of as much as 15 tons at each corner at the shear-leg end would be required to move the bridge along the tracks. A much smaller pull proved adequate, however. Ten strands of $^5/_8$-in. plow-steel rope were used at each corner to take the pull from the hoisting engine.

The path along which the bridge was moved crossed many existing tracks and a main road. On two of these tracks and on the road the traffic could be interrupted for only three or four hours, so it was necessary to arrange for the temporary tracks to be supported at these points on special timber framing that could be quickly placed and removed. One hoisting engine was used to pull the bridge up grade on the tracks at a speed of 8 ft per minute. It had to be moved successively to new locations, and the snatchblock connected to new deadmen. The bridge was blocked and guyed when not in motion, and it was not moved during high winds. During the rests in the moving, the busy tracks and the road were cleared of obstructions such as temporary track, rope haul, or horizontal tie rods.

In the new yard the bridge was jacked to the proper level at each end, set on rails that rested on temporary timbers in the gaps that had been left in the foundation walls, and then moved on these tracks until it rested over the permanent new foundation walls. Next, tie rods and knee braces were removed and the machinery parts and platforms that had been removed were replaced at the bottoms of the legs. Temporary timbers were removed from the gaps in the foundation walls and these gaps were filled with concrete construction corresponding to the rest of the walls, and the permanent rails were completed. Finally, the temporary railroad tracks on which the bridge had been moved were taken away. The moving operation had required about a month.

No unforeseen circumstance occurred in the moving operation, although as a precaution the structure was insured from the time the jacking commenced until the bridge was set in its final position.



JACKING OPERATION IN PROGRESS—TRUCKS BEING MOVED INTO PLACE UNDER A SHEAR LEG

Marine Borers on the Gulf Coast

Types of Destructive Organisms Present and Methods of Combating Them

By WINSTON E. WHEAT, M. AM. SOC. C.E.
COUNTY ENGINEER, ESCAMBIA COUNTY, PENSACOLA, FLA.

IN order to protect timber structures built in sea water it is necessary first to determine the types of marine life that are causing the trouble. Any one of several varieties, or in fact two or more varieties working together, may remove support from docks, bridges, and wharves with very little change in external appearance. Mr. Wheat relates some of his experiences with the borers on the Florida-Alabama Gulf Coast. He cites two examples of bridge failures in that area to show the menace to such structures from various forms of marine life.

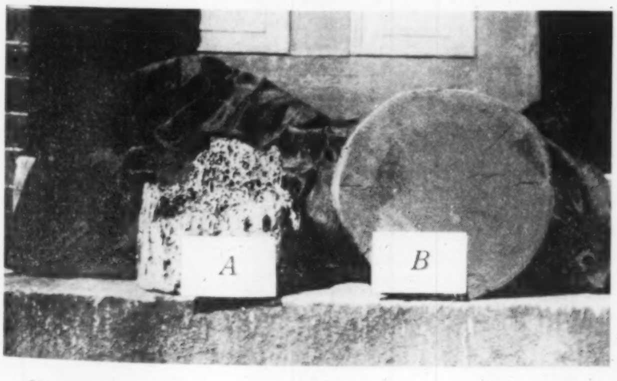
THAT wooden ships are not alone the objects of the destructive attacks of marine borers is very evident to those who live along the sea coast. The attack by these "living submarines" will rarely, if ever, threaten human life by endangering a ship, for the experienced seaman catches the warning in time. However, structures built out into salt water may be seriously undermined in such a way as to endanger life without the owner's being aware of it.

Two most vivid illustrations of this fact have occurred in the vicinity of Pensacola, Fla. One of these was the collapse of the substructure of the original highway timber bridge over Perdido Bay at Lillian, Ala., in 1929, thirteen years after its construction by the Perdido Bay Bridge and Ferry Company. The other was a similar failure of piling under a 9-year-old timber toll bridge over Santa Rosa Sound about five miles east of Pensacola in 1940. In each case, fast-moving vehicles barely escaped being dropped into the water when supporting bridge piling fell out, cut off by the marine borers.

The term "marine borer" means to so many only the "teredo," which is the best known of the "shipworms" and the one at which the commercially available preservative treatments of wood are largely directed. Engineers not well informed on the subject are likely to overlook the other species entirely when designing a structure exposed to sea water.

The two bridge failures previously mentioned are striking illustrations of the fact that the teredo is not the only borer against which a proper design must protect, for in neither case was this the borer that did the real damage. And different conditions at these two localities caused different species of borers to work on the structures, that is, the same competitors of the teredo did not do these two jobs, although the locations are close together.

In general, marine borers can be divided into two classes, those of the Molluscan family and those of the Crustacea. Their modes of attack are quite different.



VIEWS OF A PILE WHICH FAILED UNDER LILLIAN BRIDGE
Section *A* Taken at Mud Line, Section *B* at Water Level

The well-known teredo, the bankia, and the martesia are the most common of the Molluscan variety. All three go into the wood in microscopic size, then grow and work on the inside but never enlarge the entrance hole. Herein lies one of the big dangers; the strength of the timber is often practically destroyed without serious damage being apparent on the outside. The teredo and bankia are similar in appearance—long, worm-like bodies with only the head in a bivalve shell. The two valves of the shell act as a cutter-head in opening up the burrow. The long body fills the hole, which is lined with a pretty, shell-like coating. Both teredo and bankia are equipped with long siphons through which water is drawn in and expelled, the food for the animal being obtained from minute organisms in the water. Martesia looks much like a clam. The shell encloses the whole body instead of the head only. The boring is done with the shell as in the case of the teredo and bankia. The holes made by martesia are seldom over $2^{1}/_{2}$ in. in length, while those made by the bankia are sometimes several feet in length.

PILE PULLED FROM LILLIAN BRIDGE, SHOWING NO BORER DAMAGE BELOW MUD LINE

Crustacea work differently, cutting tiny runs or tunnels just under the surface, thoroughly destroying the wood or making it resemble a sponge. As the outer layers of wood are easily washed away or knocked off by fish or by boats and other floating objects, new surfaces are opened to the attack. Therefore the work of the Crustacea is usually much more easily detected than that of the Molluscan varieties. Of the Crustacea, those recognized as dangerous to timber structures are limnoria, chelura, and sphaeroma. Their methods of attacking timber are very similar. It is said that limnoria was originally identified in Norway more than a hundred years ago. Limnoria, sometimes known as the "gribble," looks like a tiny wood louse, and is from $^{1}/_{8}$ to $^{1}/_{4}$ in. long. The boring is done with a pair of horny tipped parts on the under side of the mouth. Limnoria is dangerous in its attack on creosoted timber. Chelura is somewhat similar in appearance but slightly

CONCRETE ENCASEMENTS OF RECONSTRUCTED LILLIAN BRIDGE

Although Metal Forms Have Been Washed Away, the Concrete Is Sound

larger and has longer claws and other appendages. It is of only secondary importance.

Sphaeroma is much larger than limnoria, those observed by the writer ranging from $^1/_4$ to $^1/_2$ in. long, the bodies more nearly resembling a beetle than the woodlouse type. Like the limnoria, the sphaeroma is dangerous to treated timber, as it exposes the inside untreated wood to attack by the shipworms.

The borers most dangerous to structures in salt water near Pensacola, Fla., are the teredo, bankia, sphaeroma, and limnoria. The "standard practice" of treatment, filling the outer fibers of the wood with certain preservatives such as creosote oil, has long been successfully used against the "shipworms," teredo and bankia. The failures observed by the writer have occurred where some of the other borers, such as limnoria or sphaeroma, were present to cut through the outer layers of the wood, which were filled with the oil, to the untreated wood inside. After this has been done, the teredo and bankia can go to work. Under these conditions, some engineers protect creosoted piling by encasing it in cast iron, concrete, or vitrified clay pipe in the section of the piles which their experience has indicated is in need of such protection.

It is frequently stated that the place to look for the work of marine borers is at or near tide level. But if the engineer depends on these borers to operate always according to "standard practice" he is likely to regret it. This is well illustrated in the case of the Lillian Bridge.

The original bridge at Lillian was built as a privately owned highway toll structure in 1916. Ten years later the officials of Escambia County, Fla., and of Baldwin County, Ala., purchased the bridge in order to free it of tolls, though they were warned by their engineers that the condition of the structure did not warrant the purchase. It was of light untreated timber throughout, and not long after the purchase it became necessary to remove that part of the piling above the water because of rot. It was replaced with framed column bents set on the old piles, which appeared good from water level down.

As practicaly no damage by borers was noted at tide level, it was thought that they were not active because the salinity of the water was subject to wide variations. A very narrow outlet into the Gulf of Mexico tends to limit the entrance of salt water, and at times of heavy rainfall, the fresh water from the drainage area of the two rivers emptying into Perdido Bay quickly reduces the salt content of the bay. However, during long dry seasons the tidal inflow from the Gulf restores the salinity.

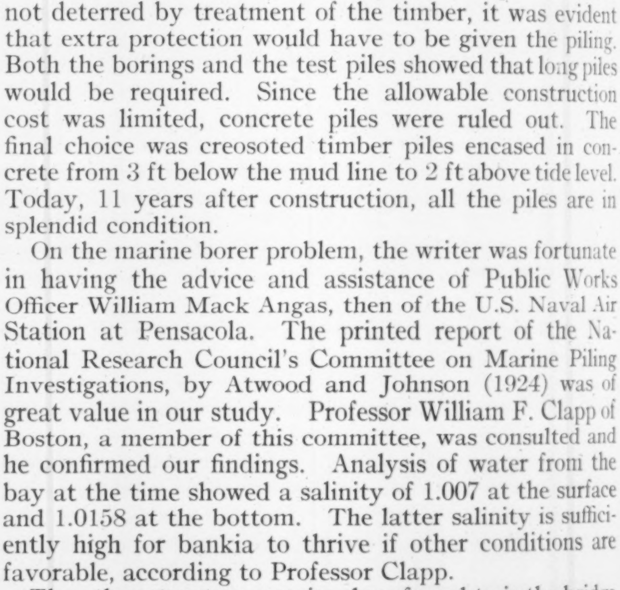
It was three years before the failure of the piles below water level brought to light the work of the marine borers. Then a span of the trestle fell under traffic, as the result of collapse of the old piles, which broke not at tide level but at the mud line 10 ft below the surface of the water. An examination of the other piles in the substructure then showed that they were badly eaten away below the water, the worst damage being uniformly at the mud line. Both sphaeroma and bankia had been busy, but from 80 to 90% of the damage had been done by bankia. As this organism is killed by fresh water, the work was done in several different seasons when the salinity happened to be right. This was clearly indicated by the condition of the timber. After each season of salty water the bankia died and their tubes evidently were entered by carnivorous worms which destroyed their bodies. The sphaeroma, which are able to thrive in brackish to fresh water, then entered the tubes and continued the work. After this, when lack of rain allowed the tides to restore the salt content to the bay water, bankia would get to work again. In many of the older bankia tubes in the wood the shell-like lining had been washed out, but others carried that lining and in many of them the live bankia were found.

When it was decided to build a new bridge, borings were made at the site by the writer. These showed a soft mud strata 22 ft thick at the bottom of the shallow bay. This mud, filled with salt through the centuries, probably accounts for the greater damage by bankia at the mud line, where the salt content of the water would be higher and the conditions therefore more auspicious for the growth of this organism.

As sphaeroma was found to be present, a species that is not deterred by treatment of the timber, it was evident that extra protection would have to be given the piling. Both the borings and the test piles showed that long piles would be required. Since the allowable construction cost was limited, concrete piles were ruled out. The final choice was creosoted timber piles encased in concrete from 3 ft below the mud line to 2 ft above tide level. Today, 11 years after construction, all the piles are in splendid condition.

On the marine borer problem, the writer was fortunate in having the advice and assistance of Public Works Officer William Mack Angas, then of the U.S. Naval Air Station at Pensacola. The printed report of the National Research Council's Committee on Marine Piling Investigations, by Atwood and Johnson (1924) was of great value in our study. Professor William F. Clapp of Boston, a member of this committee, was consulted and he confirmed our findings. Analysis of water from the bay at the time showed a salinity of 1.007 at the surface and 1.0158 at the bottom. The latter salinity is sufficiently high for bankia to thrive if other conditions are favorable, according to Professor Clapp.

The other structure previously referred to is the bridge over Santa Rosa Sound just east of Pensacola, built by



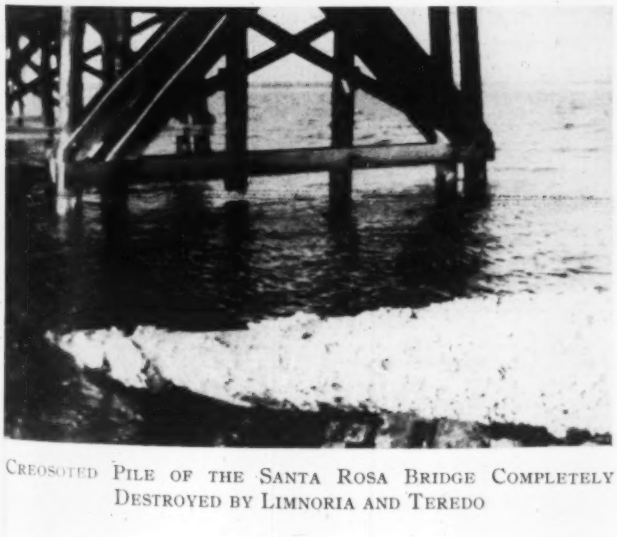
PILES UNDER SANTA ROSA SOUND BRIDGE WERE EATEN AWAY FROM TIDE LEVEL DOWN, BY LIMNORIA ASSISTED BY TEREDO the Pensacola Bay Bridge Corporation, a private concern, as a toll bridge, at approximately the same time as the Lillian structure—1931. It is a creosoted timber pile trestle. This design doubtless was decided upon instead of the more expensive concrete piling because of the length of pile found necessary to secure proper bearing, some of the piling being 70 ft long. No jacket of concrete or other protection was placed around the piles. In the summer of 1940 a vehicle passing over the bridge narrowly escaped dropping into the water when one of the pile bents suddenly collapsed. The writer was called in as a consultant to advise upon emergency repairs which would avoid closing the bridge to traffic during the busy summer season. The question was whether it would be advisable to place around the remaining old piling a concrete encasement similar to that on the Lillian Bridge.

An examination of the piles under this 9-year-old bridge revealed a most startling condition. A large part of the trestle was completely undermined and in this case, unlike the condition at Perdido Bay, the destruction of the piles extended from mud line to tide level.

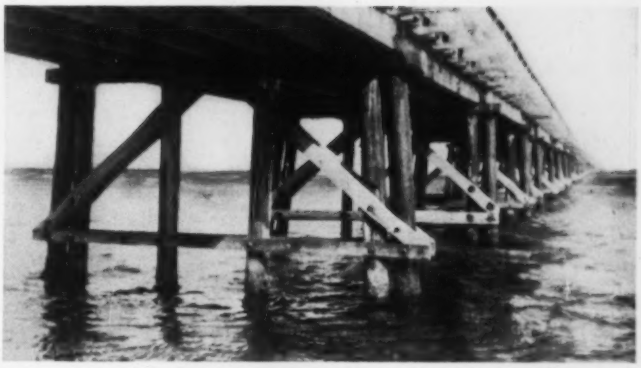
Here the outstanding borers found active were limnoria, teredo, and martesia. The wood in the piles was practically like a sponge both in appearance and to the touch. After the outer creosoted layers were cut by limnoria, the teredo had gone to work too. A number of the piles had been cut through completely by the borers, so that the sections of piling above water actually hung as a load under the bridge instead of acting as a support. In the larger piles and those of greater "fat pine" heart content, in which the borers' work was slower than in sapwood, about 20% of the cross section had not yet been destroyed. Most of the pile bents fortunately contained two or more of these better piles.

The owners said positively that they were only interested in making the structure safe for an additional life of two or three years, and this, of course, influenced the decision as to measures to be taken. The soft spongy condition of the old piles between tide level and mud line was such that for a concrete encasement to be effective, it would have to be in effect a heavy reinforced concrete column. And to use the undamaged part of the pile below the mud line as a foundation, it would have been necessary to carry the concrete well below the mud line to secure proper bond to the piles. As the water averages 22 ft in depth and the trestle is approximately a mile long, it is easily seen that the construction of such heavy concrete columns around each pile would run high in cost.

It was finally decided to drive two new creosoted timber piles in each bent. As a rule, one was placed at each end of the "caps" to avoid the necessity of cutting through the timber floor of the bridge to place the piles. The bents were then well X-braced with diagonal members running from a collar brace at tide level up to the cap, all members being well bolted together. The bracing thus acted as a truss, carrying the load from the center of the cap down to the new outside piles. When these new piles have been destroyed by the borers, a new bridge will probably be financed. When this is done, no doubt the experience with the present structure will dictate the use of a substructure immune to "living submarines." Concrete or steel piling or creosoted timber piling properly encased might well be the solution.



Creosoted Pile of the Santa Rosa Bridge Completely Destroyed by Limnoria and Teredo



Santa Rosa Sound Bridge with Temporary Repairs
Outer Piles in Each Bent Were Added

At first thought it may seem strange that the borer activity was so different in two bodies of water as close together as Santa Rosa Sound and Perdido Bay. A little study, however, clearly shows the reasons. The water in Santa Rosa Sound, unlike that in Perdido Bay, is maintained practically at the salinity of the Gulf of Mexico, with which it connects at East Pass. At the other end of Santa Rosa Sound is Pensacola Bay, a large body of water with free-flowing tides which tend to keep the water in its lower reaches up to good salt content. The piles taken from this bridge showed no indication that fresh water had ever interfered with the borers' work. Limnoria and teredo alike had very evidently enjoyed ideal conditions ever since they first entered the wood.

GENERAL COMMENTS ON ENCASEMENT OF PILES

Encasement of timber piling in concrete or in vitrified clay or cast-iron pipe filled with sand or concrete has been successful in controlling borer activity in a great number of installations. If clay pipe is used, care to protect it from breakage is very essential. Boats, drift, or excessive vibration endanger it. With any type of encasement, care must be taken to carry it below the probable depth of scour. A number of different methods of encasement are reviewed in a most constructive way in the report of the Committee on Marine Piling Investigation (Atwood and Johnson) to which reference has already been made.

The concrete pile encasements, or jackets, used successfully by the writer in protecting creosoted timber piling in salt water, consist of a shell of portland cement concrete of 1:2:3 mix, approximately 4 in. thick. Reinforcing consists of galvanized steel wire mesh weighing 30 lb per 100 sq ft, and four $^{1}/_{2}$-in. steel vertical bars. A light-gage iron form for this concrete is lowered around each pile after it is driven. The mud is then pumped out to a level not less than 3 ft below the bottom of the bay, and a "seal coat" of concrete is poured and allowed to set. Then the water is removed from the form, the reinforcing placed, and concrete poured up to 2 ft above tide level.

Pressure and Consolidation Measurements at a Western Earth-Fill Dam

By Ellis L. Armstrong, Jun. Am. Soc. C.E.
Associate Engineer, U.S. Bureau of Reclamation

Behavior of materials in an earth-fill dam has been the subject of much discussion. Actual measurements of this behavior require the installation of extensive equipment as the construction proceeds. At a dam in a Western state, Mr. Armstrong directed the installation of the apparatus he describes in this paper. His records will assist in a more rational design and control of these large structures, and hence have much interest for engineers.

The dam in question is a typical zoned, rolled, earth-fill type, having a center section of impervious sandy-clay material with supporting upstream and downstream sections of stable, comparatively semi-pervious materials increasing in coarseness toward the outside slopes. It has a maximum height of 235 ft above bedrock, a height of 155 ft above the original stream bed, a length at crest elevation of about 1,300 ft, and contains a little less than 3,000,000 cu yd of earth and rock materials.

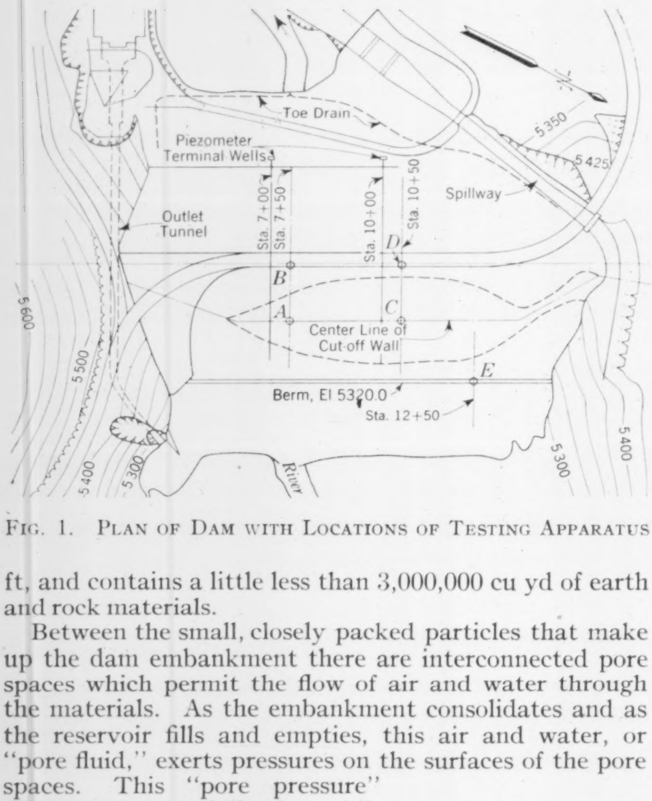

Toe Drain
Piezometer Terminal Wells
Outlet Tunnel
Sta. 7+00
Sta. 7+50
Sta. 10+00
Sta. 10+50
Spillway
5 350
5 425
D
B
A
C
Center Line of Cut-off Wall
E
Berm, El 5320.0
Sta. 12+50
5 600
5 500
5 400
5 300
River
5 300
5 400

Fig. 1. Plan of Dam with Locations of Testing Apparatus

Between the small, closely packed particles that make up the dam embankment there are interconnected pore spaces which permit the flow of air and water through the materials. As the embankment consolidates and as the reservoir fills and empties, this air and water, or "pore fluid," exerts pressures on the surfaces of the pore spaces. This "pore pressure" affects very materially the stability of the dam. Piezometer apparatus was installed in the dam to measure this pore pressure during construction and during later operation of the reservoir. From the data obtained, the extent of saturation, the percolation streamlines, and the stability of the embankment can be determined during both construction and operation.

A plan of the dam showing the locations of testing apparatus is given in Fig. 1. The apparatus consists of 72 piezometers, 36 in the plane of Sta. 7+00 and 36 in the plane of Sta. 10+00. Forty-seven of the piezometers are installed within the compacted embankment and 25 are in the dam foundation. Two reinforced concrete terminal wells, 25 ft deep, are located 295 ft downstream from the dam axis at the two stations mentioned. Each piezometer consists of a tip from which two copper tubes, $^1/_4$ in. in outside diameter, lead to the terminal well. The tips and tubes are full of liquid, as is the terminal well piping. The pore pressure acts through a porous disk on to the liquid in the tip and the two tubes. In the terminal well a system of valves allows any tube to be connected to a compound gage where observations are made.

The piezometer tip consists of a brass shell, $1^1/_4$ in. in diameter and $1^1/_2$ in. long, which is soldered onto two tubes leading from the tip to the terminal well. Its function is to hold a porous disk over the otherwise unprotected piezometer opening to prevent the entrance of embankment materials, and to provide a passageway between the two tubes to permit filling and flushing. The tips in the embankment were placed directly in the earth-fill material at the locations where the pressure measurements were desired. Tips later incorporated in the foundation were screwed onto the upper ends of $^3/_4$-in. galvanized pipes extended to the desired locations, as shown in Fig. 2, by drilling with a spudder well rig. These pipes were filled with coarse sand and liquid.

The copper tubes leading to the terminal well were placed in trenches 18 in. deep, dug across the embankment. Screened material was carefully hand tamped around the tubing and the rest of the trench was compacted with mechanical tampers. Cutoffs, consisting of silty-clay material mixed with 10% by volume of Bentonite, were placed about every 25 ft along the trenches. The tubes were filled with liquid from the terminal well by means of a small hand pump either at the time they were installed or after about 5 ft or more of compacted embankment had been placed over the

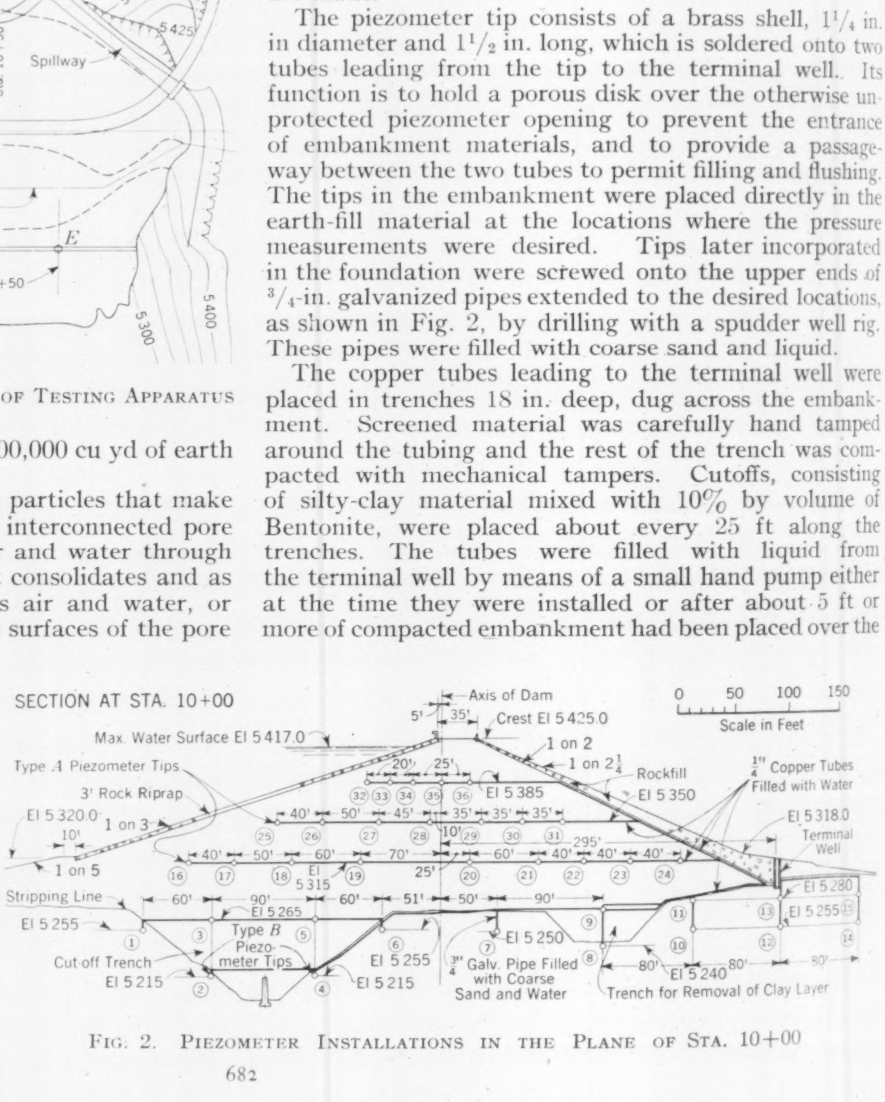

SECTION AT STA. 10+00
Axis of Dam
5'
35'
Crest El 5 425.0
0 50 100 150
Scale in Feet
Max. Water Surface El 5 417.0
1 on 2
1 on 2¼
Rockfill
El 5 350
Type A Piezometer Tips
3' Rock Riprap
20'
25'
El 5 385
¼" Copper Tubes Filled with Water
El 5 320.0
1 on 3
10'
1 on 5
40' 50' 45' 35' 35' 35'
10'
295'
El 5 318.0
Terminal Well
40' 50' 60' 70' 60' 40' 40' 40'
El 5 315
25'
El 5 280
El 5 255
Stripping Line
El 5 255
60' 90' 60' 51' 50' 90'
El 5 265
Type B Piezometer Tips
Cut-off Trench
El 5 215
El 5 255
El 5 250
¾" Galv. Pipe Filled with Coarse Sand and Water
El 5 215
80'
El 5 240
80'
80'
Trench for Removal of Clay Layer
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬
⑭
⑮
⑯
⑰
⑱
⑲
⑳
㉑
㉒
㉓
㉔
㉕
㉖
㉗
㉘
㉙
㉚
㉛
㉜
㉝
㉞
㉟
㊱

Fig. 2. Piezometer Installations in the Plane of Sta. 10+00

tips. Some trouble was encountered in replacing all the air in the tubings with liquid.

COMPLETED ZONED, ROLLED, EARTH-FILL DAM IN A WESTERN STATE

Reading observations were started soon after the lower line of tips was installed. The first readings were rather erratic because of air in the tubes. As this air was gradually worked out, the readings became more stable. They have shown that the pore pressures developed during construction were low. The tips at El. 5265 in the section above the cutoff trench showed that a maximum pore pressure of about 35 ft of water occurred at the time the embankment was completed. Most of the tips above this elevation have shown that a maximum of about 5 ft of water occurred a short time after the tips were installed and then slowly dissipated. Some of the tips above El. 5320 have shown no pressure.

The fact that higher pressures were not developed is attributed to the fact that the material was placed at, or on the dry side of, optimum moisture content, and that the rate of load application was slow, averaging about 12 ft a month. The tips extending into the foundation upstream from the cutoff trench have shown pressure heads corresponding to the water level in the reservoir with a lag of a day or two. The effect of the reservoir fluctuations on the pore pressure, and the extent of the saturation of the dam from the reservoir operations, are yet to be observed.

Settlement apparatus was installed in the dam to measure the vertical movements that occur in the embankment and foundation both during and after construction. The data from the apparatus give the rate and the final amount of consolidation of the material within the embankment and in the foundation. This apparatus also affords an opportunity to observe any horizontal movement that might occur in the embankment.

Each settlement system consists of a series of telescoping $1^1/_2$ and 2-in. pipes having alternate sections anchored to the embankment by means of cross arms. Each anchored pipe section moves with the embankment and independently of the rest of the installation. The elevations of the anchored sections are determined by lowering a special engaging device into the pipes by means of a steel chain. Pawls on the device successively engage the ends of the anchored pipe, until, on reaching the bottom of the installation, the pawls are latched closed and the device can be withdrawn.

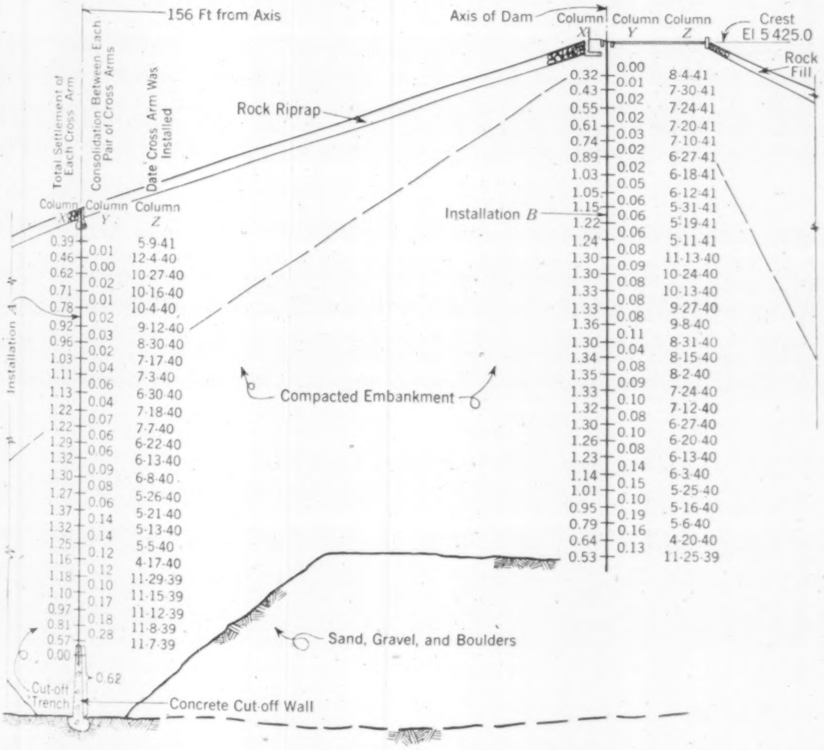

156 Ft from Axis
Total Settlement of Each Cross Arm
Consolidation Between Each Pair of Cross Arms
Date Cross Arm Was Installed
Column X
Column Y
Column Z
Rock Riprap
Installation A
0.39 0.46 0.62 0.71 0.78 0.92 0.96 1.03 1.11 1.13 1.22 1.22 1.29 1.32 1.30 1.27 1.37 1.32 1.25 1.16 1.18 1.10 0.97 0.81 0.57 0.00
0.01 0.00 0.02 0.01 0.02 0.03 0.02 0.04 0.06 0.04 0.07 0.06 0.06 0.09 0.08 0.06 0.14 0.14 0.12 0.12 0.10 0.17 0.18 0.28
5-9-41 12-4-40 10-27-40 10-16-40 10-4-40 9-12-40 8-30-40 7-17-40 7-3-40 6-30-40 7-18-40 7-7-40 6-22-40 6-13-40 6-8-40 5-26-40 5-21-40 5-13-40 5-5-40 4-17-40 11-29-39 11-15-39 11-12-39 11-8-39 11-7-39
0.62
Cut-off Trench
Concrete Cut-off Wall
Compacted Embankment
Sand, Gravel, and Boulders
Axis of Dam
Column X
Column Y
Column Z
Crest El 5425.0
Rock Fill
Installation B
0.32 0.43 0.55 0.61 0.74 0.89 1.03 1.05 1.15 1.22 1.24 1.30 1.30 1.33 1.33 1.36 1.30 1.34 1.35 1.33 1.32 1.30 1.26 1.23 1.14 1.01 0.95 0.79 0.64 0.53
0.00 0.01 0.02 0.02 0.03 0.02 0.02 0.05 0.06 0.06 0.06 0.08 0.09 0.08 0.08 0.08 0.11 0.04 0.08 0.09 0.10 0.08 0.10 0.08 0.14 0.15 0.10 0.19 0.16 0.13
8-4-41 7-30-41 7-24-41 7-20-41 7-10-41 6-27-41 6-18-41 6-12-41 5-31-41 5-19-41 5-11-41 11-13-40 10-24-40 10-13-40 9-27-40 9-8-40 8-31-40 8-15-40 8-2-40 7-24-40 7-12-40 6-27-40 6-20-40 6-13-40 6-3-40 5-25-40 5-16-40 5-6-40 4-20-40 11-25-39

FIG. 3. SECTION AT STA. 7+50, WITH SETTLEMENT DATA

There are five of these settlement measuring systems installed in the dam, making a total of 123 cross arms. Two of the systems are on the dam axis, one at Sta. 7+50 and one at Sta. 10+50; two are directly above the cutoff wall at these same stations; and one is located at the berm 325 ft upstream from the axis at Sta. 12+50. At every 5-ft rise in embankment elevation, a 2-in. pipe, and a $1^1/_2$-in. pipe section with a cross arm, were added to the system already in place.

SETTLEMENT MEASUREMENTS TAKEN REGULARLY

A scale was bolted to the top pipe of the system and its elevation determined from points outside of the dam area. To measure settlements, the torpedo-shaped engaging device was lowered into the pipe and the distances to the measuring points in the system were read and their elevations determined. These readings were taken each time an installation was made, and have been taken once a month since the completion of the dam.

A section of the dam at Sta. 7+50, showing the settlement installations and certain settlement data, appears in Fig. 3. Settlement is defined as the vertical movement of one cross arm. Consolidation is defined as the difference in vertical movement of two cross arms. It will be noted that installation "A" is tied into the concrete cutoff wall at the bottom of the cutoff trench. A measuring point was concreted into the wall so that the settlement of the foundation rock could be determined.

PLACING COPPER TUBING FOR PIEZOMETER INSTALLATIONS

In Fig. 4 are shown graphically certain data from installation "B," the location of which appears in Fig. 1. The cumulative consolidation curve shows the total amount of consolidation in the embankment between the foundation and the top of the embankment at a particular date and corresponding to a particular height of embankment, shown by the progress of the embankment placing curve. The foundation settlement shown for installation "B" is the settlement of the sand, gravel, and boulder material upon which the embankment rests.

Installation "A" (Fig. 1) is tied into bedrock, in which no settlement is apparent. After the embankment was completed at this installation, which terminates on the upstream slope 50 ft below the top of the dam (see Fig. 3), the consolidation continued at a rate indicating that a load was being applied by the downstream earth-placing operations. The same was true at installation "C."

The material gradation, moisture content, and unit weight of the dam embankment as constructed were determined from numerous tests taken in the embankment during the construction period. The material was a sandy clay with 70% passing $^1/_4$-in. mesh and 18% clay (smaller than 0.005 mm). It had an average unit wet weight of 135 lb per cu ft and a moisture content of 16% of dry weight. Settlement, percolation, and other tests were also made on the materials in order to correlate theoretical studies with actual structure behavior.

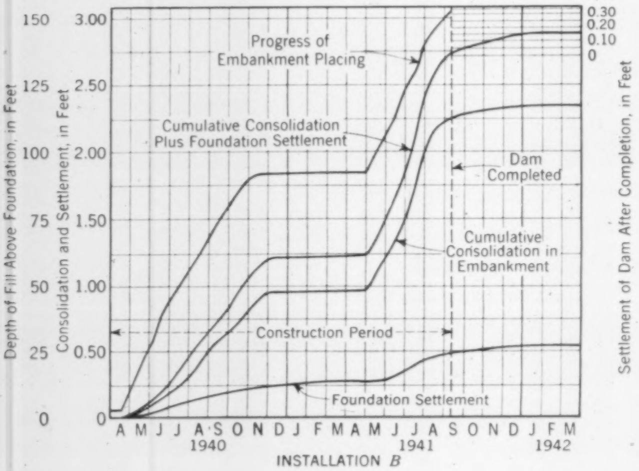


FIG. 4. PROGRESS OF EMBANKMENT PLACING AND CONSOLIDATION AND SETTLEMENT AT INSTALLATION "B"

EFFECT OF SATURATION TO BE DETERMINED

From the time each pair of cross arms was placed until four months after the embankment was completed, the consolidation between the cross arms showed an approximate straight-line variation of from zero at the top of the embankment to about 3% with 150 ft of fill load. Some additional consolidation within the embankment is expected with time, and it should be mentioned that some consolidation took place before the top cross arm of each 5-ft increment was placed and the measurement of the increment started. The amount of slow long-time consolidation of the embankment is yet to be determined, as is also the settlement effect, if any, of saturation by water from the reservoir.

Aside from supplying data for research purposes, the testing program is valuable in that it supplies data for determining the best method of reservoir operation. With the care taken in design and construction, weaknesses of the structure are not apt to develop under expected conditions; but the apparatus does serve as a safeguard against some unforeseen condition developing that might endanger the stability of the structure if steps were not taken to correct it.

It should be noted also that the settlement data available from the installations were at least a factor, if not the deciding factor, that influenced the decision to include the construction of the parapet and curb walls across the top of the dam under the contract for the dam construction. They were thus built immediately following the completion of the earth fill. This is a departure from past practice of allowing the completed structure to stand for one or more years before constructing these walls. It was thus possible to take advantage of very favorable bid prices and to eliminate the inconvenience and unsightliness that result from delaying this work. This saving alone justifies a considerable part of the test installations. By proper planning, little interference with the regular construction operations was caused by the installation work.

These testing apparatus were developed by the engineers of the U.S. Bureau of Reclamation and are similar to those installed in earth dams lately constructed or being constructed by them. The writer was in direct charge of the installations here described. John A. Beemer, M. Am. Soc. C.E., was resident engineer in charge, and E. O. Larson, Jun. Am. Soc. C.E., is construction engineer for the project. J. L. Savage, Hon. M. Am. Soc. C.E., is chief designing engineer, and S. O. Harper, M. Am. Soc. C.E., is chief engineer, of the Bureau of Reclamation, and John C. Page, M. Am. Soc. C.E., is Commissioner of Reclamation.

Engineers' Notebook

Ingenious Suggestions and Practical Data Useful in the Solution of a Variety of Engineering Problems

Soil Penetration Tests with a Loaded Auger

By A. R. LAMM
VIRGINIA ENGINEERING COMPANY, INC., AND WISE CONTRACTING COMPANY, INC., RICHMOND, VA.

DURING the present period of emergency, many plants and buildings are erected on land which was not previously considered suitable for building developments, and where the properties of the soil are seldom known to any great extent. It is nearly always necessary to carry out test borings and bearing-capacity trials, and these are seldom completed before the design is made and the construction work ready to be started. It might, therefore, be of timely interest to remind engineers of a quick and sufficiently safe way by which the bearing capacity of soil can be investigated in time to influence the design.

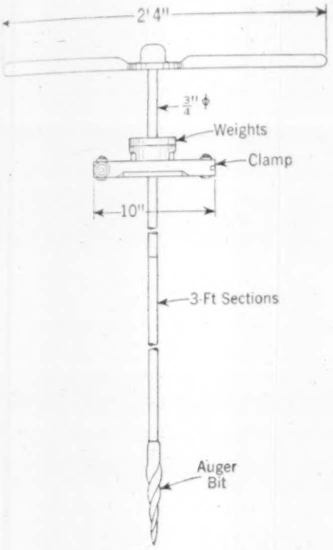


FIG 1. EARTH PENETRATION AUGER

The following method of using penetration tests instead of the usual test borings has been fully described by the Danish civil engineer O. Godskesen in *Ingenioeren* (No. 44, 1930, and No. 46, 1936). This report has been taken directly from these publications.

The tool for the tests is nothing but an auger (Fig. 1) consisting of smooth $^3/_4$-in. diameter steel rods, usually in lengths of 3 ft, connected without any projected couplings, and a slightly twisted 1 by 1-in. boring point. The penetration of the auger into the earth is caused by weights, usually up to about 220 lb, placed on the upper boring rod. The weights are attached successively to the auger, and the penetration is measured, for instance, for 50-lb, 100-lb, 150-lb, and 200-lb loads. When the auger does not penetrate any more for the 200-lb load, the actual penetration test starts.

By means of a handle attached to the top of the upper boring rod, the now loaded auger is screwed down; and the sinking of the point below grade is measured for each 25 half turns. The results are drawn up using the total penetration as ordinates and the corresponding penetrations per 25 half turns as abscissa. Where the penetration of the loaded auger is less than 20 in. per 25 half turns, the soil has a bearing capacity suitable for direct foundations. If firm ground is first reached at such a depth as to indicate the need of piling, the test should be carried on until the penetration is 2 to 3 in. per 25 half turns.

The foregoing explanation is valid for borings from original grades. Borings in open pits produce a velocity of penetration greater than borings from original grades. By carrying out a reasonable number of these penetration tests, it is usually possible to get a very clear picture of the variations in the bearing capacity of the soil. The conventional boring test, whereby samples of the soil are brought up and often judged by their appearance only, is not very reliable. Testing the soil samples in the laboratory is time-consuming and costly.

The penetration test with a loaded auger has been used to a very great extent in the Scandinavian countries since 1927. Several bridge foundations have had their designs based exclusively on such tests, omitting test borings entirely. The pentration test is comparatively cheap and gives results independent of the observer's judgment—which cannot be said of the conventional method.

General Solution for Earth Pressures

By A. R. BROWN
STRUCTURAL ENGINEER, VETERANS ADMINISTRATION, WASHINGTON, D.C.

TO determine the amount, direction, and point of application of the resultant pressure on any plane in a granular, non-cohesive material of definite extent is a problem that confronts engineers in various fields. To solve it, a direct graphical solution is here presented. This is based on: (1) Coulomb's theory of the wedge of maximum thrust, and (2) the proposition that the pressures are equal and opposite on each side of a given plane. For the general case, the algebraic solution is rather complex, but for special conditions of fill, algebraic formulas of practical use may be derived. In materials of indefinite extent, where the conditions are identical, this solution gives the same results as those obtained by Rankine's and Coulomb's theories.

Rankine's theory determines the amount and direction of the pressure only in a material of indefinite extent, which is a condition that does not exist except in case of a level fill, and yields excessive pressures in cases of positive surcharge. For instance, the formula, $P = {}^1/_2\, w\, h^2 \cos \phi$, is not applicable in practice, yet it has no doubt been widely used in the design of such structures as retaining walls and bins.

Coulomb's theory does not determine the direction of the pressure, which may be assumed at any angle—between zero and the angle of friction (ϕ)—with a plane normal to the plane on which the pressure acts. Thus a variety of results may be obtained, more or less at variance with the actual pressure in the material.

Experience has shown that theoretical solutions based on materials of indefinite extent, or on an assumed angle of friction between the wall and the material, do not give consistent results, and lead to serious errors in design. Various authorities on earth pressures have for this reason attempted to reconcile theory with experience by modifying the theory, by developing empirical formulas, or by establishing ratios of base width to height of wall, for varying conditions of fill.

In an attempt to clarify the confusion that has existed with respect to earth pressures, the writer submits the solution illustrated in Figs. 1, 2, and 3 and the accompanying explanatory steps, which apply to all the figures. In applying the solution in practice, the angle of friction ϕ, the top surface of material ABC, and point O, representing the heel of the base of the wall, are established. The pressure P is next obtained on any convenient plane OS, and combined with the weight of the fill between plane OS and the face of the wall to obtain the amount and direction of pressure on the wall. Fill to the left of the wall face is then disregarded.

The wall is furthermore assumed to be an adjustable component part of the material through which a definite line of pressure acts. This is on the theory that since a condition of stability existed in the material prior to substitution of the wall, if the latter is properly designed, it will offer similar stability and furthermore resist a certain amount of shock or vibration. To maintain such stability, the wall faces should be roughened if required, and proper drainage provided, to maintain the angle of friction between the contact surfaces of wall and material. Although various classes of fill may be deposited against the wall, it is believed that the assumption of an ideal granular, non-cohesive material is on the safe side and will yield satisfactory results for all practical purposes.

GRAPHICAL SOLUTION

Given: Angle of friction ϕ, broken top surface ABC, at angles $\pm\delta$ and e, equal to or less than the angle of friction ϕ; point O; and plane OS, against which the pressure is desired.

To find: Amount, direction, and point of application of pressure P on plane OS.

Construction: Figs. 1, 2, and 3.

1. Draw lines OC and OD at angle ϕ with the horizontal, OD making angle β with AB.
2. Prolong CO, and lay off $OE = OD$.
3. Prolong BC, and draw EF making angle β with OE.
4. Connect OB, and draw DG parallel to OB.
5. Connect EG, and draw OH parallel to EG.
6. On FC as a diameter, construct semicircle intersecting a perpendicular erected on FC at H, at point K.
7. With FK as a radius, draw arc cutting FC at N.
8. Draw ON, one boundary of the edge of maximum thrust. (The other boundary, OM, is located by making $MQ = NR$.)

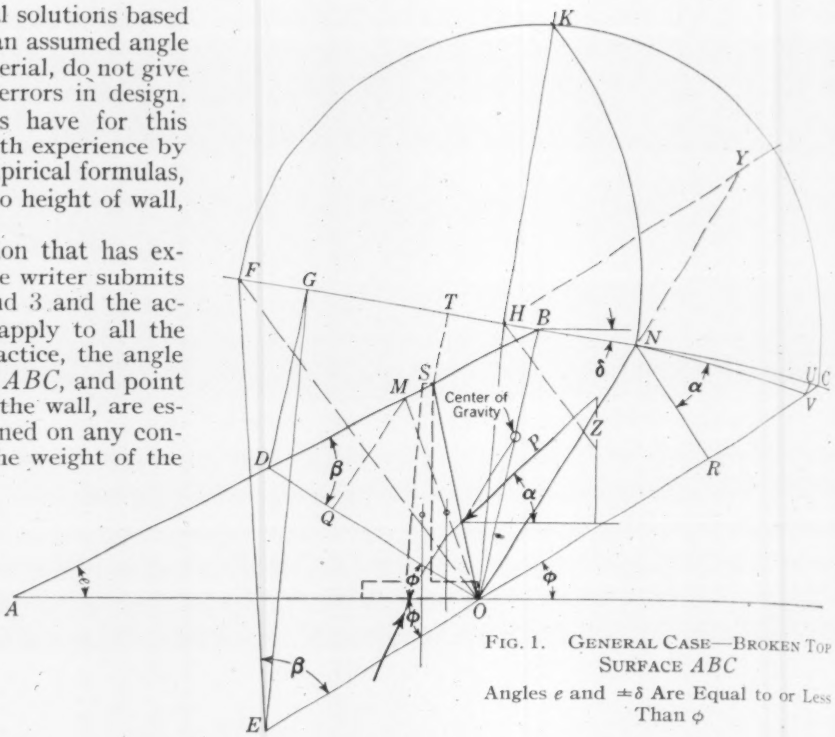


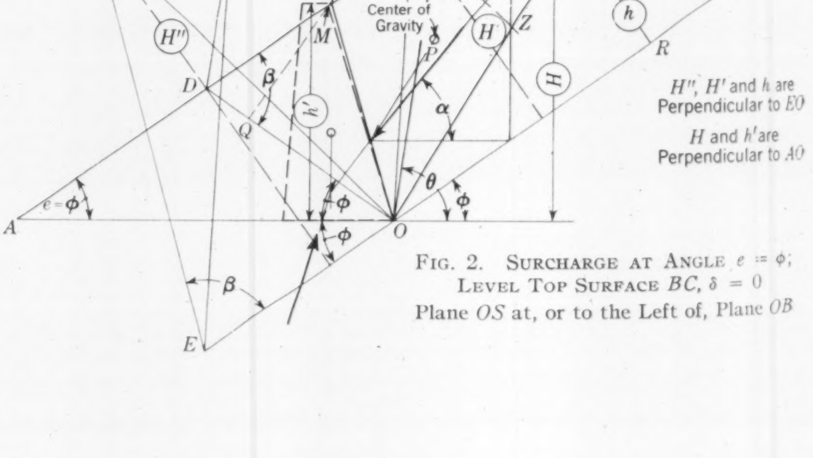
FIG. 1. GENERAL CASE—BROKEN TOP SURFACE ABC

Angles e and $\pm\delta$ Are Equal to or Less Than ϕ

9. Draw ST parallel to OB, and lay off $NU = NT$.
10. Draw UV parallel to ON, and connect NV.
11. Draw NR perpendicular to OC. Then $P = w/2 \times \overline{NR} \times \overline{NV}$, w being the weight per cubic foot of the material, and the horizontal thrust $P_h = w/2 \times \overline{NR}^2$.

11*a*. (Alternate construction for locating plane ON): Draw HZ parallel to FO, and HY parallel to OC. With straightedge and dividers, find a line OY such that intercept $ON = YZ$. If there is no error in drafting, point N and plane ON should coincide with the location found in Steps 6, 7, and 8 preceding.

12. Find center of gravity of area $OSBN$, and through it draw a line parallel to ON. Where this line



H'', H' and h are Perpendicular to EO

H and h' are Perpendicular to AO

FIG. 2. SURCHARGE AT ANGLE $e = \phi$; LEVEL TOP SURFACE BC, $\delta = 0$

Plane OS at, or to the Left of, Plane OB

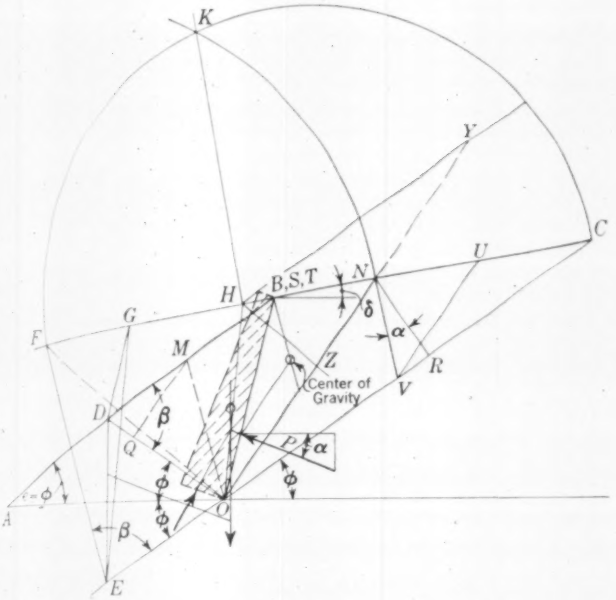


FIG. 3. WALL LEANING AGAINST FILL, $e = \phi$

cuts OS, pressure P is applied at angle $RNV = \alpha$ with the horizontal. (Step 12 is approximate, but usually on the safe side, when area $OSBN$ is not a triangle.)

SPECIAL CASES

For the special case shown in Fig. 2, equations have been derived to find the amount and direction of P on any plane OS at, or to the left of, plane OB. In this case,

$$H'' = \frac{H}{2}\left(3 - \frac{\cot\theta}{\cot\phi}\right)\frac{\sin(2\phi)}{\sin(3\phi)} \quad \text{..........(1)}$$

$$H' = H\,\frac{(\cot\phi - \cot\theta)\left(3 + \dfrac{\cot\theta}{\cot\phi}\right)\sin\phi}{3 - \dfrac{\cot\theta}{\cot\phi}} \quad \text{........(2)}$$

$$h = H'' - \sqrt{H''(H'' - H')} \quad \text{............(3)}$$

$$\tan\alpha = \frac{\dfrac{H}{h}\left[(\cot\phi - \cot\theta)(2H - h') - \dfrac{h}{\sin\phi}\right] - \left(\dfrac{H}{\sin\phi} - h\cot\phi\right)}{h} \quad \text{........(4)}$$

$$P = \frac{w}{2} \times \overline{NR} \times \overline{NV} = \frac{w}{2} \times \frac{h^2}{\cos\alpha} \quad \text{..........(9)}$$

when $h = NR$.

Assuming $H = 18.6$ ft and $h' = 14$ ft, the graphical solution gives $P = 100/2 \times 8.83 \times 14.1 = 6{,}225$ lb, and $\alpha = 51° 10'$. By algebraic solution, for $\theta = 82°$ and $\phi = 35°$, $H'' = 26.27$ ft; $H' = 14.7$ ft; $h = 8.83$ ft; $\alpha = 50° 50'$; $P = 100/2 \times 8.83^2/0.63 = 6{,}188$ lb. The drafting error in this instance is less than 1%, and should not exceed 2%.

In Fig. 3, the wall leans against the fill and exerts an active pressure which is balanced by the passive pressure P. In order for the wedge of material OBN to exert an active pressure downward at some angle ϕ' with a perpendicular to the wall, the wall would have to be considered as rigidly fixed in position. The amount of active pressure would then depend on the value of ϕ' selected.

In the case of a reinforced concrete retaining wall, two graphical constructions are necessary: (1) that in which plane OS is the face of the stem, and (2) that in which plane OS extends from the heel of the base to the top of the stem. The triangular section of earth between plane OS and the wall is inert and its weight is combined with that of the wall in providing stability. (See Fig. 1.)

Cases involving unusual surcharges due to roads or railroad tracks, or saturated fill, may be handled as outlined in various books on the subject, by a combination of pressure diagrams for each particular condition involved.

The minimum pressure consistent with stability of the material is obtained by assuming angle $e = \phi$ for fill to the left of plane OS.

Our Readers Say—

In Comment on Papers, Society Affairs, and Related Professional Interests

Present-Day Responsibilities of the Engineer

DEAR SIR: The article, "The Faith of the Engineer," in the August issue, is so timely that I am impelled to compliment the author for his perspicacity.

It requires an honest and forthright attitude for a man who is "successful" by the older engineering standards to admit the failings of his group and to venture analysis in a field which, by training, engineers are taught to avoid. Mr. Morgan limits the boundaries of the engineer to physical routine, insisting that he (the engineer) is not educated for socio-philosophic endeavors and that he is unaware of the social implications of his efforts.

Nowhere, however, does Mr. Morgan insist that a revision of the basic educational system be instituted immediately. Those of us who are engineering school graduates realized as soon as we entered this "bright new world" that we had better remove our rose-colored glasses. Things weren't as they were supposed to be. The fiction of ethics soon disappeared when we sweated over a drafting board, following orders whether we thought them wise or not. Everything possible was done to make alert youth conform to the routine. Ideas were discouraged, social and political interests frowned upon. That was our indoctrination in the profession. Not to question, but to do.

Nor does Mr. Morgan's analysis of the engineer's philosophical capacity give credit to our fine institutions of learnings. Contact with one's fellow students does develop a strong political outlook and an awareness of social implications, for it is not until the young engineer starts his first job that he is kept from thinking along these lines. Faced with such repressions, the engineer should be more alert than ever, for upon him depends the well-being of society.

If we think of these things, we become aware of a great social future for the engineer. His code of ethics has toppled because he lives in a world that tramples on him, and he must adjust himself to new conditions. Accordingly, it becomes necessary for the engineer to take the following steps:

1. He must band together with his fellow engineers in an organization primarily devoted to his economic welfare. There is no stigma attached to this. Unionization is quite proper and recognized by government agencies. The fiction of professionalism has long since been destroyed; and if the "élite" societies of the older men have failed the younger man, the older men must be held to blame. It is no mean thing for Mr. Morgan to admit that unions have an appeal to the younger engineers while the older ones sit

back. It means that the future of the profession lies in the hands of the younger men.

2. He must voice his opposition as a group—not alone—to employer policies detrimental to the social well-being of the community. If these policies are not opposed, he will be the one to suffer in the long run.

3. He will have to be critical, and he must insist upon having something to say in corporation policies. As an effective organization is necessary to carry out such a program, the need for unionization is again indicated.

There is one other point of importance. All this must be done now. We engineers are in the midst of the greatest technical effort any country has ever made. We are the ones who determine "how" the wheels will spin. We are the ones who can spot inefficiencies in production and sabotaging of the war effort through deliberate "business as usual" policies. We are the ones who know what is not being done to win the war, for we are the technicians behind the guns.

It is easy for a technical man to sit back and say, "Well, that is the way things are. Nothing can be done about it." Of course, in that way, he will avoid any controversy, will be on the "right" side, will be patted on the back for his dumbness. But the engineer must have the stamina to go contrary to accepted custom and fact, to be inconvenienced financially and even ostracized because of new ideas.

Berkeley, Calif. WALTER J. GRAY, Jun. Am. Soc. C.E.

Trained Timber Designers Needed

TO THE EDITOR: The present demand for engineers will become increasingly acute the longer the war lasts. Hence, in addition to a general engineering education, the engineering student should be given specialized training to fit him for the present emergency. He should be given the tools that will relieve the shortage of essential structural materials.

The majority of engineering graduates have been trained to use steel as a structural material. Yet the amount of steel available for structural purposes is limited. Why, then, should a large number of architectural and structural engineering students be given detailed training in steel design, when they will not be able to make immediate use of such knowledge which is forgotten so easily? Lumber, on the other hand, is and will be available for essential structures and can, in many cases, free steel for other strategic purposes, if it is used by engineers who have been taught the potentialities of wood and the recent developments in the design of timber structures. The economical, practical, and skilled use of lumber for the war effort calls for an increasing number of engineers who have experience in timber design and know how to manufacture timber structures. Hence, design with wood as a structural material should be given priority in engineering curricula, as indicated by H. J. Hansen in his paper in the November issue of CIVIL ENGINEERING.

For the duration of the war emergency, it may be advisable to rearrange curricula for architectural and structural engineers, so that they will devote most of the time, hitherto used for steel design and detailing, to timber design. The comparatively small amount of time at present spent in teaching timber structures could be devoted to steel design, in order to familiarize the engineering student sufficiently with this important phase of his profession.

Within a relatively short time, such a procedure would equip young engineers with a background sufficient to let them take advantage of one of our greatest natural resources—wood. Engineers who have previously attained skill and experience in structural steel design will be available for that work. The recent graduate with his knowledge of the most recent developments in timber design, on the other hand, could furnish the necessary services for essential timber structures.

The lack of experience in timber design of many of the college and university faculties may make it advisable to arrange for short courses in timber design for those who are to teach the modern aspects of timber utilization. Such short courses could take place under the auspices of the Forest Products Laboratory, the National Lumber Manufacturers Association, and the Timber Engineering Company, centers of knowledge and experience in the economical and efficient use of wood as a structural material.

E. GEORGE STERN, Assoc. M. Am. Soc. C.E.
Research Engineer, in Charge of Wood
Research Laboratory, Virginia
Blacksburg, Va. *Polytechnic Institute*

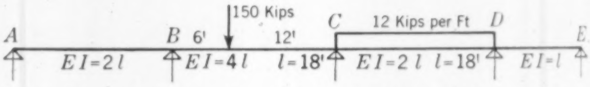
Solving for Moments in a Continuous Beam

TO THE EDITOR: In the October issue Professor Rathbun demonstrates the solution of moments in a continuous beam by one unknown. The style of delineation that he uses will answer for the easy problem he solved. If this style is applied to more complex structures, in which sidesway, settled supports, semi-rigid joints, semi-rigid splices, and other special conditions are involved, it will either fail to operate or else the computations will get lost in a maze of overlapping moment diagrams.

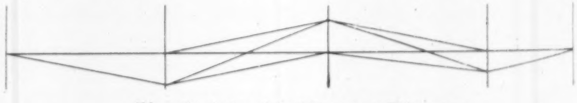
The accompanying Fig. 1 (*d*) shows a method of delineation that will meet the requirements of these special conditions. This figure shows the angles of slope of the elastic curve over supports. It also shows as an angle the change in direction of the elastic curve due to each moment component.

The computations for Fig. 1 (*d*) are exactly like the closure computations of a survey traverse or a series of profile grades, except that in progressing across a support an adjustment of the curvature due to difference in stiffness in members is necessary. For example, the angle $12x$ at the left of B becomes $6x$ at the right of B, because BC is twice as stiff as AB. The solution, with all angle values determined by progressive computation from A to E, is shown on the figure. The delineation used will also permit the construction by a direct method of a complete influence line for the effect of a moving load at any support or any intermediate point in a span. Also, when shifts in loading are involved it provides visible automatic checks of the computations by Maxwell's theorem of reciprocal deflections, angular, which is a feature of great value.

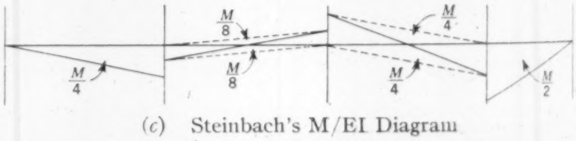
RALPH W. STEWART, M. Am. Soc. C.E.
Engineer of Bridge and Structural Design,
Los Angeles, Calif. *City of Los Angeles*



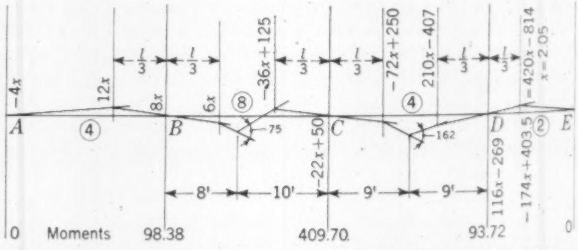
(*a*) Rathbun's Loading of a Four-Span Continuous Beam



(*b*) Steinbach's Moment Diagram



(*c*) Steinbach's M/EI Diagram



(*d*) Stewart's Angles of Slope of Elastic Curve at Supports

FIG. 1. CONTINUOUS BEAM WITH FOUR SPANS

To THE EDITOR: I was interested in Professor Rathbun's solution for continuous beam moments as it appeared in the October issue of CIVIL ENGINEERING. As the distribution of moments in a multiple-span continuous beam simply supported depends on the section and the length of the beam between supports, it is my opinion that the method of moment distribution is the most applicable in this case.

I would like to submit my solution (Table I) of the moments in Professor Rathbun's beam as obtained in less than ten minutes. I am sure that anyone familiar with Professor Cross's method of moment distribution will agree that this is the simplest with which to attack a problem of this nature.

RICHARD F. SILBERSTEIN,
Jun. Am. Soc. C.E.

Long Beach, Calif.

TABLE I. SOLUTION BY MOMENT DISTRIBUTION

	A	B		C		D		E	
Relative Stiffness		2	4		2		1		
Modified Stiffness		$(^3/_4)2 = 1.5$	4		2		$(^3/_4)1 = 0.75$		
Distribution		$\frac{3}{11}$	$\frac{8}{11}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{8}{11}$	$\frac{3}{11}$		
Fixed End Moments	0	0	$\frac{150 \times 6 \times 12^2}{18^2}$	$\frac{150 \times 12 \times 6^2}{18^2}$	$\frac{12 \times 18^2}{12}$	$\frac{12 \times 18^2}{12}$	0	0	
	0	0	−406	−200	−324	−324	0	0	1st
Balance	0	−109	+291	−83	+41	+235	−89	0	Distribution
Carry Over	0	0	+41.5	−145.5	−117.5	−20.5	0	0	2d
Balance	0	+11.5	−30	+19	−9	+15	−5.5	0	Distribution
Actual Moment	0	−97.5	−97.5	−409.5	−409.5	−94.5	−94.5		
Rathbun	0	−98.38	−98.38	−409.7	−409.7	−93.38	−93.38	0	
% Difference	0	−0.9%	−0.9%	−0.4%	−0.4%	+1.2%	+1.2%	0	

To THE EDITOR: Professor Rathbun's brief article on solving moments in a continuous beam by one unknown, in the October issue, is an adaptation of the Greene-Mohr principle to the solution of these structures and to single-span rigid frames. It is admitted by writers on the subject to be much simpler than most of the classic methods, but for some reason its possibilities have been overlooked in the schools, in the textbooks, and in office practice generally.

If the solution is set down in tabular form rather than in the cursive form used in the article, its true simplicity will be evident. Referring to Figs. 1 (*b*) and 1 (*c*) and the accompanying Table I, the tabular computation for the moments due to settlement, Δ at support *C*, is illustrated.

For simplicity, consider slopes upward to the right, moments causing sag bending and settlement at the right end of a span to be positive. All computations are algebraic. M_L and M_R are the restraining moments at the left and right ends of a span, respectively. M_W is the simple beam moment due to loading; ϕ_L and ϕ_R are the slopes at the left and right ends of the span. Column 5 in Table I is the summation of (1) the moments of the moment areas in the span about the right support and (2) the offset from the right support of the tangent to the slope at the left end of the span. Column 5 is set equal to zero and solved for M_R; and Column 7 is the summation of the moment areas in the span and the slope at the left end, and is equal to the slope at the right end of the span.

If the left end of the structure is fixed, ϕ_L equals zero and M_L equals kx, and the solution follows as before. If the right end of the structure is fixed, Col. 5 in the last span is set equal to zero and solved for M_R. This value is substituted in Col. 7, which is set equal to zero and solved for x, since ϕ_R equals zero.

The influence line for the reaction at the settlement is proportional to the deflection curve caused by the settlement, and may be determined from the moment diagram by double summation of increments of the M/EI diagram, in the general case.

ARNOLD STAUBACH, Assoc. M. Am. Soc. C.E.
Designing Engineer,
Texas Highway Department

Austin, Tex.

TABLE I. SOLUTION BY GREENE-MOHR PRINCIPLE

(1) Span	(2) Hem	(3) Value	(4) $\Sigma M/EI$	(5) $\Sigma M/EIy$	(6) M_R	(7) $\Sigma M/EI$	(8) ϕ_R	(9) M	(10) ϕ
A								0	$+0.0264\,\Delta$
AB	ϕ_L M_L M_W M_R	— 0 — M_R	$+4x$ 0 0 $+\frac{M_R}{4}$	$+4xl$ 0 0 $\frac{M_R}{4}\,\frac{l}{3}$	$-48x$	$+4x$ 0 0 $-12x$	$-8x$		
B								$-0.3165\,\Delta$	$-0.0528\,\Delta$
BC	ϕ_L M_L M_W M_R	— $-48x$ — M_R	$-8x$ $-6x$ — $\frac{M_R}{8}$	$-8xl$ $-4xl$ $+\Delta$ $\frac{M_R}{8}\,\frac{l}{3}$	$+288x - \frac{24\,\Delta}{l}$	$-8x$ $-6x$ — $+36x - \frac{3\,\Delta}{18}$	$+22x - \frac{3\,\Delta}{18}$		
C								$+0.5667\,\Delta$	$-0.0217\,\Delta$
CD	ϕ_L M_L M_W M_R	— $+288x - \frac{24\,\Delta}{18}$ — M_R	$+22x - \frac{3\,\Delta}{18}$ $+72x - \frac{6\,\Delta}{18}$ — $\frac{M_R}{4}$	$+22xl - 3\,\Delta$ $+48xl - 4\,\Delta$ $-\Delta$ $\frac{M_R}{4}\,\frac{l}{3}$	$-840x + 96\frac{\Delta}{l}$	$+22x - \frac{3\,\Delta}{18}$ $+72x - \frac{6\,\Delta}{18}$ — $-210x + 24\frac{\Delta}{l}$	$-116x + 15\frac{\Delta}{l}$		
D								$-2.056\,\Delta$	$+0.0684\,\Delta$
DE	ϕ_L M_L M_W M_R	— $-840x + \frac{96\,\Delta}{l}$ — M_R	$-116x + 15\frac{\Delta}{l}$ $-420x + 48\frac{\Delta}{l}$	$-116xl + 15\,\Delta$ $-280xl + 32\,\Delta$	$-396xl + 47$ $x = \frac{47\,\Delta}{396 \times 18}$	Δ $= 0.006594\,\Delta$	$-536x + 63\frac{\Delta}{l}$		
E								0	$-0.0344\,\Delta$

$$M_B = -48x = -48 \times 0.00659 = -0.3165\,\Delta \quad \phi_B = -0.0528\,\Delta$$

$$M_C = 288x - \frac{4}{3\,\Delta} = 1.900 - 1.333 = +0.5667\,\Delta \quad \phi_C = -0.0217\,\Delta$$

$$M_D = -840x + \frac{16}{3\,\Delta} = 5.5389 - 5.333 = -0.2056\,\Delta \quad \phi_D = +0.0684\,\Delta$$

The Engineer and Human Relations

TO THE EDITOR: Judged by his accomplishments in recent decades, the engineer has good cause to be proud of his record. He has shown courage and daring, but each step has been made after careful calculation and the consideration of all known factors. True, there have been failures, but even the failures have proved spurs to further progress—to the opening up of new vistas of human knowledge.

The achievements of the engineer in our own times are too numerous to mention. Turbulent rivers, which for countless generations have periodically overrun their banks and brought destruction to those living near-by, have been tamed by him and made to serve man. The engineer has built bridges over miles of water, and constructed railways and highways in deserts and swamp-lands. Great distances have been literally annihilated by his development of the means of rapid transportation and communication. In the factory and the home, he has provided comforts that have turned toil into pastime. Under the stress of the present emergency great inventions and processes that normally would require many years for materialization are being brought to perfection in brief intervals of months or even weeks.

However, the engineer has failed to consider one factor that hangs like the sword of Damocles over all he has accomplished. That factor is human relations. Because of the neglect of this factor, great structures that have taken years to build are being destroyed in a few seconds. Dnieprostroy, the hydroelectric and navigation development that was the pride of Russia, was blown to bits—probably by the same engineers who helped build it. Stalingrad, the marvel industrial city on the Volga, is literally being wiped off the face of the globe. Inventions that were meant to aid and comfort man are being used to kill and harass him. Over 400,000,000 human beings in Europe alone are faced by the specter of starvation or semi-starvation during the coming winter. These are unpleasant facts, but they constitute the stark reality we must face.

The engineer can no longer shrug his shoulders and say, "This is something I cannot help. My function is only to build or produce." Perhaps the motto of the "Seabees," the Construction Battalions of the U.S. Navy, is a prophetic indication of what the attitude of the engineer should be. Their motto is "We defend what we build." Yes, the engineer must take a leading role in the establishment of human relations that will ensure the endurance of his great works for the benefit of man.

The solution of the problem is not an easy one, and it cannot be accomplished by formula and slide rule. It requires more than a knowledge of natural science or the fundamentals of industrial management. Indeed, it requires enough knowledge of the history of mankind to understand the forces that have built and wrecked the great civilizations of the past and that have brought our own civilization to its present pass. It requires a familiarity with the behavior of man as an individual and as a member of society. There are specialists in these fields, and the engineer need only be sufficiently well informed to take full advantage of their contributions. But the same inexorable logic that has driven the engineer to build in accordance with the laws of nature and without trusting to blind luck should help fit him for leadership in establishing enduring human relations.

SAMUEL BAKER, M. Am. Soc. C.E.
Dean, Schools of Technology,
Scranton, Pa. *International Correspondence Schools*

Comments on Distribution of Wind Stresses in Mast Guys

DEAR SIR: In my article, "Distribution of Wind Stresses in Mast Guys," in the September issue, I find an error and an omission. In the fourth paragraph read "the chord length will be shortened to (not by) the amount C_x."

The expression $\frac{w^2C^3}{24T^2}$ in Eq. 2 comes from $S = \frac{wC^2}{8T}$, whence

$$L - C = \frac{8}{3}\frac{S^2}{C} = \frac{w^2C^3}{24T^2}.$$

This last derivation would not be immediately evident; it was apparently omitted from one of the figures.

Walkerville Canada C. M. GOODRICH, M. Am. Soc. C.E.

Studies in Light-Reflecting Concrete

TO THE EDITOR: The writer has for several years been studying white concrete and the factors that influence its reflectivity, and therefore read with much interest M. A. Berns' article, "Light Reflecting Concrete for Factory Floors," in the October issue. Some general comments and data obtained in the writer's study may be worth adding to the valuable field data presented by Mr. Berns.

It has been found that the reflectivity of neat white cement and neat white waterproof cement is 82% and that this value is reached in 15 days. Standard gray portland cement, when mixed with light brown river sand, has a reflectivity of 20% for a cast surface, 28% for a troweled surface, and 33% when mixed with white sand. The value of 28% for a troweled surface may be compared with that of 27.6% reported by Mr. Berns. Standard white cement or waterproof white cement, when mixed with white sand and washed limestone in a 1:2:3 mix by volume, has an average reflectivity of 72% for a troweled surface. This differs considerably from the value of 44% obtained by Mr. Berns. The coarse aggregate, so long as it is clean and is not exposed by placing or wear, has no effect upon the surface reflectivity. The water-cement ratio has a pronounced effect upon reflectivity as may be seen from the accompanying Fig. 1. These values are for troweled surfaces. That part of the test specimen which was cast against the paraffin-coated mold was from 8 to 35% lower in reflectivity than the troweled surface, averaging 20% lower. The better surface produced by troweling is due to the finishing operation which smooths out minor roughness of texture and causes cement particles to rise, producing a smoother and more reflective surface. It may also be seen from Fig. 1 that moist curing results in a darker surface.

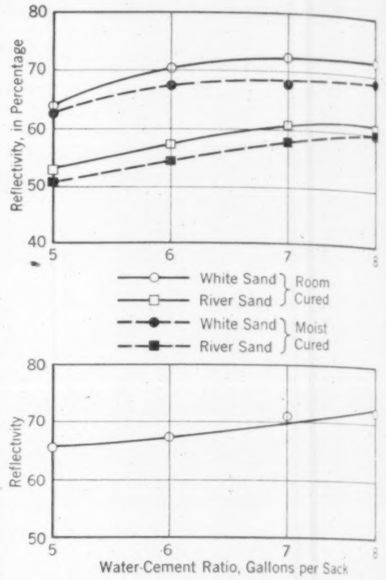


FIG. 1. REFLECTIVITY WATER-CEMENT RATIO CURVES FOR TROWELED SURFACES OF STANDARD AND WATERPROOF WHITE CEMENT SPECIMENS

Each Plotted Point Represents the Average of Two Specimens

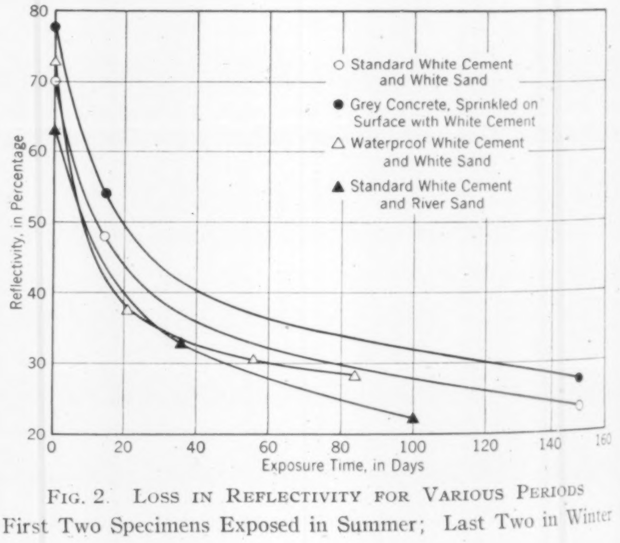


FIG. 2. LOSS IN REFLECTIVITY FOR VARIOUS PERIODS

First Two Specimens Exposed in Summer; Last Two in Winter

TABLE I. WHITE CONCRETE SUBJECTED TO ATMOSPHERIC EXPOSURE*

Specimen Type	Exposure Period, Days†	Reflectivity, Percentage: Original	Reflectivity, Percentage: Final	Reflectivity, Percentage: After Cleaning	Loss in Reflectivity Percentage‡	Gain in Reflectivity by Cleaning Percentage‡
Standard white cement . . .	150 *S*	72	24	24	67	0.0
Same but using river sand . .	100 *W*	62	22	22	65	0.0
Standard waterproof cement .	85 *W*	71	31	36	56	7
Gray portland cement concrete (white cement sprinkled on surface in amount of 1 lb per sq yd)	150 *S*	78	27	35	65	10

* Water-cement ratio of 8 gal per sack with white sand. Troweled surfaces. Each value represents the average of two specimens.

† *S* indicates summer, and *W* indicates winter exposure. ‡ Expressed as a percentage of the original reflectivity.

The statement made by Mr. Berns regarding the reflectivity after six months' use did not indicate whether the floor was "dirty" or had been cleaned when the data were secured. It would be interesting to know the increase in reflectivity after cleaning.

In Fig. 2 are shown characteristic outdoor exposure curves for white concrete,and in Table I were summarized some results after the exposure specimens were cleaned with a mild soap solution. After standard white cement specimens were wet with water for 10 min and then surface dried, they lost 22% of their original reflectivity, and waterproof white cement specimens lost 14%. Both types had an 8-gal per sack water-cement ratio. Severe cycles of freezing and thawing may reduce the surface reflectivity of white concrete as much as 41%.

Wetting agents added in the amount of 1 or 2% by weight will overcome the difficulty of mixing waterproof white cement without affecting the properties. Dispersing agents, wetting agents, or penetrants, in general, have a tendency to increase workability and thereby to increase slightly the reflectivity of both types of cement.

C. W. Muhlenbruch, Jun. Am. Soc. C.E.
Assistant Professor of Civil Engineering,
Carnegie Institute of Technology

Pittsburgh, Pa.

Forum on Professional Relations

Conducted Column of Hypothetical Questions, with Answers by Dr. Mead

Drawing from his long experience, Dr. Mead currently answers questions on engineering ethics in these columns. Question No. 1 which was published in the September number of Civil Engineering *was answered in the same number, with no opportunity for discussion, as it was used simply as an example of the way in which these questions would be asked and answered. Question No. 2 was also offered in the September number; it was answered in November. Herewith Dr. Mead gives his views on the important subject of the relation of the young engineer and the contractor on the construction of public works announced in the October number as Question No. 3: "An engineer supervising the work in a project is able to suggest to the contractor many money-saving methods that do not lower the quality of the work. While on the job the engineer eats at the contractor's mess house. Should he accept his board from the appreciative contractor?"*

Under normal conditions of construction throughout the United States, hundreds of young engineers get their first experience in engineering work as inspectors on public and private works of various descriptions and their first contact with contractors. In such positions one of two things is almost sure to result—the young engineer, unfamiliar with the details of construction, is almost certain either:

1. To insist upon unnecessary requirements which may greatly add to the expense of the work of construction, or
2. To be altogether too lenient and permit work detrimental to the ultimate results required by the specifications.

The latter result, which favors the profit of the contractor, is sometimes encouraged by occasional unscrupulous contractors through sundry favors, such as gifts of cigars or theater tickets, use of the contractor's automobile, and an almost unlimited number of other favors which may be offered to the young and inexperienced man.

Sometimes the contractor's efforts to secure favoritism may go so far as the offer of actual payments to the inspector to permit the scamping of the work. This is bribery, a criminal offense subject to severe legal penalty, but not too uncommon in muncipal work. The acceptance of favors grades so gradually into bribery that where one ends and the other begins is not always obvious. The only sure way to avoid this pitfall is to confine the relations of engineer and contractor to the acceptance of only minor favors that can be and are returned in kind, as outlined in the answer to Question No. 1 in the September issue. This entire matter is so closely related to the experience of thousands of engineers in the country that it was hoped it would open a discussion along lines which would prove helpful to all concerned.

The first question deals with the receipt of favors and the response considered advisable by the writer. The third question, now under discussion, deals more specifically with the inspector of wider experience. When he is given supervision of work done by a less experienced contractor, he may be able to offer legitimate suggestions which, while assuring satisfactory results, will aid in the economy of construction. Such suggestions are directly to the benefit of the contractor, and it might therefore be considered permissible for the engineer who has given this assistance to accept a reasonable return in such form as is suggested by the question. This question, by the way, was actually asked the writer by one of his class of young engineers who had had some experience in actual construction work.

The writer would say that he views these questions from the vantage point of fifteen years' experience as the head of a contracting company which did some million of dollars worth of public works. His contracting experience was discontinued in the earlier years of the present century, and his time has since been devoted to engineering and educational work. He has therefore given this subject considerable thought from the point of view of both the contractor and the engineer.

In answer to Question No. 3 the writer must therefore conclude that it is entirely improper for an inspector to accept valuable compensation of any kind for benefits that he may be able to give to a contractor whose work is under his supervision. If such aid is given for compensation, or if compensation is accepted in payment for such service, it is apt to lead the inspector to increase these benefits so that such compensation may be increased. Ultimately it is likely to result in the acceptance of unsatisfactory work for improper compensation. No man can serve two masters: the only compensation received by an inspector should come from the legitimate source—that is, from his engineer-employer.

D. W. Mead, Past-President and Hon. M. Am. Soc. C.E.
Madison, Wis.

These questions will be discussed in the columns of Civil Engineering each month. For example, Question No. 4, given on page 628 of the November number, will be answered by Dr. Mead in the January number. Next in sequence, for study and written discussion by members until January 5, with answer in the February issue, will be the following:

Question 5: *"A" owned a mining right which he considered valuable but which he was unable to develop on account of lack of capital. "B" was employed by a mining company which was anxious to acquire "A's" rights but pretended indifference, hoping that this would cause "A" to be willing to sell at a low figure. "A" approached "B" and told him that he would give him a certain sum of money if he would persuade his company to buy his rights, for a stated sum. "B" knew that the company would be glad to obtain the rights at this figure. Was "B" justified in accepting a commission from "A"?*

SOCIETY AFFAIRS

Official and Semi-Official

Looking Toward the Ninetieth Annual Meeting

Preliminary Program of Technical and Social Events Scheduled for January 20–22, 1943, in New York, N.Y.

Plans are well under way for the Ninetieth Annual Meeting of the Society to be held in New York City beginning Wednesday, January 20, 1943, and continuing through Friday noon, January 22. The meeting will be conducted in line with the current policy of the Society during these war times of streamlining its activities as far as possible. Practically all the time allotted for technical sessions will be devoted to discussion of engineering matters related to prosecution of the war. However, keeping in mind the old adage about "all work and no play," social events will be included in the program, although to a less extent than formerly. The Engineering Societies Building will be Headquarters for the entire meeting, except for two or three events of a social nature.

River Crossing on the Alaskan Route
Project to Receive Detailed Discussion at All-Afternoon Session

Full details of the program will appear in the January issue of Civil Engineering, but a brief summary is presented here.

General Business Meeting

The Annual Meeting will open on Wednesday morning with a general business session, including a report on the activities of the Society for 1942, and the awarding of Society prizes and conferring of Honorary Memberships. Newly elected officers will also be inducted into their respective offices at this time.

The winners of prizes and awards have been selected and many of them will be present to receive these honors in person. This year, the prizes will include:

The Norman Medal
The J. James R. Croes Medal
The Thomas Fitch Rowland Prize
The James Laurie Prize
The Arthur M. Wellington Prize
The Collingwood Prize for Juniors
The Rudolph Hering Medal
The Construction Engineering Prize
The Daniel W. Mead Prize for Students

Honorary Membership in the Society is to be conferred on five distinguished civil engineers, all of whom are members of the Society. Those elected are:

Alonzo J. Hammond, Consulting Engineer, Chicago, Ill.; and Member, Construction Contract Board, Corps of Engineers, U.S. Army, Washington, D.C.

Lawrence M. Lawson, U.S. Commissioner, International Boundary Commission, United States and Mexico, El Paso, Tex.

Rear-Admiral Ben Moreell, CEC, U.S.N., Chief, Bureau of Yards and Docks and Chief of Civil Engineers, U.S. Navy, Washington, D.C.

Lt. Gen. Brehon B. Somervell, Corps of Engineers, U.S.A., Commanding General, Services of Supply, War Department, Washington, D.C.

Sherman M. Woodward, Consultant and Chief Water Control Planning Engineer, Tennessee Valley Authority, Knoxville, Tenn.

At the general business session, the tellers will report on the canvass of ballots. Following the induction of the new President into office, and the introduction of the new members of the Board of Direction, the meeting will adjourn for luncheon, which will be served in the Engineering Societies Building.

Technical Program

In the past, it has frequently been the custom to begin the sessions of the Technical Divisions on Wednesday afternoon. This year, however, that time will be devoted to a technical program but not one sponsored by any particular Technical Division. The entire afternoon will be given over to a series of papers on the subject of the Alaska Highway.

It is proposed to have four phases of this project discussed. These will include the history and organization of the project, construction methods, problems of location (in which air-photography was utilized), and some of the details of design, including a discussion of soil studies. Some of the papers will be illustrated with slides. The Alaska Highway is an outstanding engineering feat and is of such vital importance from an international as well as an engineering standpoint, that it has been decided to devote an entire half-day to it. The presentations will be by officials of the Corps of Engineers and the Bureau of Public Roads who have been in close touch with the design and construction of the route.

Beginning Thursday morning and running through Friday noon, Technical Divisions will present programs, according to the following schedule:

Thursday Morning, January 21, 1943

City Planning Division
Construction Division
Sanitary Engineering Division
Soil Mechanics and Foundations Division

Thursday Afternoon, January 21, 1943

Highway Division
Sanitary Engineering Division
Soil Mechanics and Foundations Division
Structural Division

Friday Morning, January 22, 1943

Engineering Economics (not definite)
Hydraulics Division
Power Division (not definite)

Programs of all these Divisions are now being prepared under the guidance of their executive committees or subcommittees, and all details, including subjects of papers and authors, will appear in the next issue of Civil Engineering. Members of the Sanitary Engineering Division will participate as usual in the sessions of the New York Sewage Works Association on Friday. Included are morning and afternoon meetings, a joint luncheon with a technical program, and the Annual Joint Dinner in the evening.

We Are at War—No Excursion!

Because of the transportation situation and the need to streamline the meeting because of the importance of time to those in attendance, there will be no Society excursion at this Annual Meeting. It is expected that those who have known and remem-

Primitive Conditions Encountered Along Alaska Highway To Be Described at Wednesday Afternoon Session

bered pleasantly these happy occasions in the past, will be disappointed, but they will appreciate the necessity of foregoing this feature as a war measure in 1943.

Social Events

Though there will be no excursion, it is well recognized that our good spirits and friendly relationships must be kept up even during the serious business of war. Accordingly two of the customary social events will be on the Annual Meeting schedule.

On Wednesday evening, January 20, the annual dinner, reception, and dance will be held in the Grand Ballroom of the Waldorf-Astoria Hotel at Park Avenue and 50th Street, New York City. This is a gala event, unsurpassed in its dignity, in its banquet, and in its social aspects.

On Thursday evening, the annual Smoker will take place in the Biltmore Hotel. It will begin with dinner at 6:30 p.m., followed by entertainment from 8:30 to 9:30. The remainder of the evening will be devoted to pure sociability among members and guests, who will welcome this opportunity to renew old acquaintanceships and to make new ones.

As in the past, many college reunion luncheons and dinners will be held during the week. Because the Annual Meeting is shorter than normally, the most convenient time for such events will doubtless be on Thursday evening. For the convenience of alumni planning such reunions, arrangements have been made for the use of private dining rooms at the Biltmore Hotel or for reserved tables at the annual Smoker. Thus these special groups can be together for the evening, and their regular Smoker tickets will cover the expense.

Student Chapter Conference

The Executive Committee of the Metropolitan Student Chapter Conference is making plans for its program on Wednesday, January 20. This conference includes the Student Chapters at:

Brooklyn Polytechnic Institute
College of the City of New York
Columbia University
Cooper Union
Manhattan College
Newark College of Engineering
New York University
Rutgers University

It is understood, however, that other Chapters within reasonable traveling distance will be invited. All students will attend the opening session on Wednesday morning, after which they will go to a special student luncheon at the Town Hall Club, 123 West 43d Street. The party will then return to the Engineering Societies Building where the Conference will be addressed by several speakers on subjects of interest to engineering students.

Advance registration cards and a summary of the Meeting will be mailed to the membership well in advance of the Meeting dates. Those who plan to attend are requested to make reservations and order tickets in advance for the various events. All hotel reservations should be secured as early as possible. They should be made directly with the hotel managements. A list of many of the hotels within reasonable distance of Society Headquarters will appear in the program in the next issue of Civil Engineering.

It is true that we are at war; time is valuable and transportation facilities are limited. But in view of the nature of the program and the importance of engineering in this war, everyone who can possibly do so is urged to attend this Ninetieth Annual Meeting of the Society.

Professional Records of Nominees

Brief Biographical Sketches of Candidates for Society Offices

Ezra Bailey Whitman

Ezra Bailey Whitman was born in Baltimore, Md., on February 19, 1880. He was educated at Baltimore City College and Cornell University, receiving the degree of C.E. from the latter institution in 1901. From 1902 to 1905 he was a member of the Baltimore firm, Williams and Whitman. He then (1906) became division engineer in charge of sewage disposal for the Baltimore Sewerage Commission, remaining in that capacity until 1911 when he was made chief engineer and president of the Water Board of Baltimore.

Ezra B. Whitman
Nominee for President of the Society

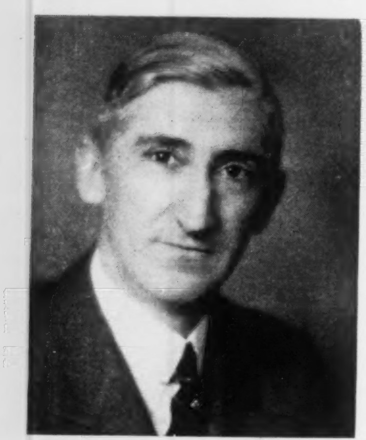
From 1914 to 1916 Mr. Whitman was a member of the firm, Greiner and Whitman, and from 1916 to 1925 of the firm, Norton, Bird and Whitman. Since the latter year he has been senior partner in Whitman, Requardt and Smith. His firm has specialized in the design and construction of sewage disposal plants and water supply systems, and in evaluation surveys. In the field of public service he has been on various engineering commissions, including the Public Service Commission of Maryland; the Engineer Board of Review of the Sanitary District of Chicago; and the Maryland State Roads Commission, of which he is chairman. He was also chairman of the Efficiency and Economy Commission of Baltimore, which brought about the reorganization of the municipal government between 1924 and 1928, with a substantial reduction in the tax rate at a time when most other cities were experiencing a rising tax rate.

During the first World War he had the rank of major in the Construction Division of the Army. He was stationed at Camp Mead, where he served as Construction Quartermaster and Utility Officer. In connection with the present war, his firm has been engineer-architect for three chemical warfare projects at Edgewood, Md.; Huntsville, Ala.; and Denver, Colo. These three projects will cost approximately $135,000,000.

Joining the Society as a Junior in 1903, Mr. Whitman was elected Associate Member in 1906 and Member in 1910. He served as Director from 1923 to 1925. He has also been active in the affairs of the Maryland Section. His other technical affiliations include the American Society of Mechanical Engineers; the American Institute of Electrical Engineers; the American Water Works Association; the New England Water Works Association; the Institute of Consulting Engineers; and the American Public Health Association.

EDGAR M. HASTINGS

EDGAR M. HASTINGS was born May 5, 1882, and educated at Baltimore City College and Baltimore Polytechnic Institute. He is an honorary alumnus of Virginia Military Institute. He has spent his professional life in the field of railroad engineering. In 1903—after a few years with the Baltimore and Ohio—he became identified with the Richmond, Fredericksburg and Potomac Railroad. From 1903 to 1906 he was instrumentman and inspector on location and construction; from 1906 to 1920 resident engineer; and from 1920 to 1922 principal assistant engineer. He has been chief engineer since 1922.



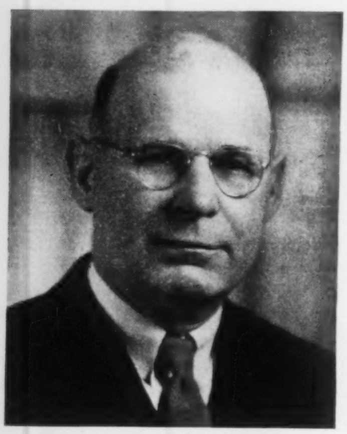
EDGAR M. HASTINGS
Nominee for Vice-President,
Zone II

Elected an Associate Member of the Society in 1910 and Member in 1922, Mr. Hastings has had a number of committee assignments. He has been particularly active in Student Chapter work and is now chairman of the Committee on Student Chapters. He is also a member of the Executive Committee of the Engineering Economics Division. Long active in the Virginia Section, he has served that organization as president.

He is a member of the American Railway Engineering Association, which he has served as director, vice-president, and president. Mr. Hastings is also doing important committee work for the Association of American Railroads and has been chairman of its engineering division. His other professional affiliations include membership in the American Society for Testing Materials, the National Society of Professional Engineers, the Engineers Club of Hampton Roads, and the Central Virginia Engineers Club (past-president). He is a member of the National Technological Civil Protection Committee, to which he was appointed by the Secretary of War; and is also chairman of the City Planning Commission and of the Board of Zoning Appeals for the City of Richmond (Va.).

THOMAS R. AGG

THOMAS R. AGG was born in Fairfield, Iowa, on May 17, 1878. He received the B.S. degree at Iowa State College in 1905 and the professional degree C.E. in 1914. He was an instructor in drawing and, later, in theoretical mechanics at the University of Illinois from 1905 to 1908, and served in various capacities on the engineering staff of the Illinois State Highway Department from 1908 to 1913. In the fall of 1913 he joined the faculty of the civil engineering department at Iowa State College, where he was placed in charge of highway engineering instruction and research. He remained in that capacity until 1930, when he was made assistant dean of engineering. In 1932 he became dean of engineering and director of the Engineering Experiment Station, in which capacities he is now serving. In 1936 he received the George S. Bartlett Award for outstanding instruction and research in highway engineering.



THOMAS R. AGG
Nominee for Vice-President,
Zone III

Dean Agg is author of *Construction of Roads and Pavements*, joint author with Anson Marston of *Engineering Valuation*, and joint author with the late W. L. Foster of *Engineering Reports*. He has also written many research reports, published as Engineering Experiment Station bulletins, and general papers on engineering subjects that have appeared in Society publications or other engineering journals.

He became a Member of the Society in 1920 and served as Director from District 16, from 1938 to 1940. His other professional affiliations include membership in the American Society for Testing Materials, the Society for the Promotion of Engineering Education, and the Iowa Engineering Society. He is also a member of the Executive Committee of the Highway Research Board.

REUBEN EDWIN BAKENHUS

REUBEN E. BAKENHUS was born in Chicago, Ill., on September 10, 1873. He attended private and public schools in Chicago and graduated from Massachusetts Institute of Technology in 1896, receiving the degree of B.S. in civil engineering. After a year on the teaching staff at Massachusetts Institute of Technology he was, successively, with the Metropolitan (Boston) Water Board; the U.S. Civil Service Commission Examining Force; and the U.S. Engineer Office on the construction of the Government Printing Office, Washington, D.C.

REUBEN E. BAKENHUS
Nominee for Director, District 1

He was commissioned in the Civil Engineer Corps of the U.S. Navy on February 27, 1901, with the rank of lieutenant (jg). He was advanced through the various ranks and commissioned rear admiral in November 1932, retiring with that rank on October 1, 1937. Admiral Bakenhus graduated from the U.S. Naval War College in 1924, and served three years on the staff of the Naval War College in the Departments of Tactics and Command and as head of the Logistics Department. While in the naval service he was engaged on engineering works of great variety. He designed and operated power plants, and built and operated railway systems for Navy yards. He was, also, in charge at various Navy yards of all public works design, construction, and maintenance. This work included industrial buildings and waterfront structures of all kinds, drydrocks (graving and floating), shipbuilding ways, marine railways, and other harbor and waterfront works. He was project manager for the design of U.S. Armor Plant at Charleston, W.Va., and in charge of construction by day labor. He also prepared first dredging and harbor improvement plans for the U.S. Naval Station at Pearl Harbor, and made recommendations for the harbor at Midway Island.

During the first World War, in addition to his naval duties, he was assistant manager and, later, manager of the Shipyard Plants Division of the Emergency Fleet Corporation, having charge in varying degrees of design and construction of some two hundred shipyards. From 1918 to 1923 he was assistant chief of the Bureau of Yards and Docks, and for one year acting chief of the Bureau.

Since his retirement he has practiced as consulting engineer in New York City, specializing in waterfront and harbor work, valuations, and expert court testimony.

Admiral Bakenhus joined the Society in 1907 and has been active in the Metropolitan Section. His other affiliations include membership in the American Institute of Consulting Engineers (vice-president), the Society of American Military Engineers (past-president), Military Order of the World War, and the Society of Military and Naval Officers of the World War.

DEAN G. EDWARDS

DEAN GRAY EDWARDS was born in Orland, Me., on September 13, 1882. He received a degree of A.B. from Harvard University in 1903 and the degree of S.B. in civil engineering from the Lawrence Scientific School in 1904. From 1904 to 1907 he was employed by the Rapid Transit Commission, and its successor, the Public Service Commission, in the construction of the original subway of New York City and on surveys and plans for subway extensions.

Dean G. Edwards
Nominee for Director, District 1

From the latter year to 1911, Mr. Edwards was assistant division engineer for the New York Board of Water Supply on the construction of the Newburgh division of the Catskill Aqueduct. After completing surveys for the extension of the Atlantic, Waycross and Northern Railroad, he became resident engineer for the Bradley Contracting Company on the construction of two sections of the Lexington Avenue Subway. In June 1915 he became chief engineer of the Inter-Continental Construction Corporation, for which he had charge of subway construction in Brooklyn. From 1919 to 1933 he was president and general manager of Edwards and Flood, Inc., general contractors. During that period he directed the construction of numerous projects in the vicinity of metropolitan New York, including railroad work, grade-crossing eliminations, highway work, and power-house foundation construction.

In 1933 and 1934, Mr. Edwards was chief engineer of the Civil Works Administration for the city of New York. Later he was deputy administrator for the NRA. Early in 1936 he became consulting engineer for the Citizens Budget Commission, Inc., of New York City, and from 1938 until late in 1942 he served in a similar capacity for the Borough President of Manhattan, except for a few months as chief of the Construction Branch of the War Production Board. He is now chief engineer of the Department of Borough Works of the Borough President's Office.

For several years Mr. Edwards was a consultant for the National Resources Planning Board and worked in an advisory capacity with the Susquehanna River Drainage Basin Committee, the Delaware River Drainage Basin Committee, and the New York–New Jersey Drainage Basin Committee.

He joined the Society as a Junior in 1904, became Associate Member in 1910, and a Member in 1920. He has served a term on the Executive Committee of the Construction Division and was its chairman for a year. He has also been chairman of the Society's Committee on Salaries and of the National Conference on Engineering Positions. He has also been president of the Metropolitan Section and has served on numerous Section committees.

His other professional affiliations include the Municipal Engineers of New York City (of which he was president), the American Public Works Association, the Society of American Military Engineers, the Society of Terminal Engineers, the New York State Society of Professional Engineers, and the Harvard Engineering Society (president).

Charles B. Breed

Charles B. Breed was born in Lynn, Mass., in 1875 and graduated from the Massachusetts Institute of Technology with the S.B. degree in 1897. Summers during his college career and later he held positions with various railroads, the Metropolitan Water Department of Boston, the Massachusetts Harbor and Land Commission, and other organizations. From 1899 to 1914 he was at Massachusetts Institute of Technology, successively as assistant, instructor, assistant professor, and associate professor. Since 1914 he has been a full professor, and since 1933 head of the department of civil and sanitary engineering. From 1939 to 1941 he was chairman of the faculty.

Coincidentally for part of this period (1909 to 1916) Professor Breed was a member of the consulting firm, Barrows and Breed, of Boston, on the elimination of grade crossings for several cities, municipal street paving, water supply and drainage problems, bridges, and buildings. Since then he has acted as consultant to several railroads, state highway departments, and public service groups on projects involving bridge foundation problems, railroad reorganizations, waterfront construction, valuation of public utilities, and the arbitration of construction contracts.

Professor Breed is co-author with Prof. George L. Hosmer of a two-volume treatise on *Principles and Practice of Surveying*, and author (1942) of *Surveying*, and of several reports on highway transportation economics and on the coordination of highway and railway transportation. He is also associate editor of the American Civil Engineers' Pocketbook and the American Mining Engineers' Handook.

Charles B. Breed
Nominee for Director, District 2

Elected an Associate Member of the Society in 1903 and Member in 1911, Professor Breed is now serving as chairman of the Committee on Definition of Surveying Terms of the Surveying and Mapping Division, and as national committeeman of the Transportation Division of the Committee on Civilian Protection in War Time.

He is a former president of the Boston Society of Civil Engineers and of the New England Railroad Club. During the first World War he was president of the academic board of the U.S. Army School of Military Aeronautics, located at Massachusetts Institute of Technology. His other affiliations include membership in the Engineering Institute of Canada, the Boston Society of Civil Engineers, the American Roadbuilders' Association, the Highway Research Board, the American Railway Engineering Association, the Society for the Promotion of Engineering Education, the New England Railroad Club, and the Massachusetts Highway Association. He is a registered engineer in the states of New York and Rhode Island. He is national honorary member of Chi Epsilon, honorary member of Sigma Xi and Tau Beta Pi, and member of Phi Sigma Kappa.

Charles F. Goodrich

Charles F. Goodrich was born in Manchester, N. H., on November 7, 1881. He graduated from Dartmouth College with the degree of B.S. in 1905, and from the Thayer School of Engineering (Dartmouth) with the degree of C.E. in 1906. In 1939 Dartmouth College gave him the honorary degree of doctor of engineering.

Immediately after his graduation Dr. Goodrich entered the employ of the American Bridge Company, at the Trenton (N.J.) plant, and has been connected with that organization ever since. In 1910 he was transferred to the designing and estimating department, New York City office. From 1919 to 1933 he was assistant engineer in the chief engineer's office, and in January 1933 was appointed assistant chief engineer, with offices in New York City. On July 1, 1935, he was elected chief engineer of the company, with headquarters at Pittsburgh, Pa. During this long period he was in charge of design and engineering for the American Bridge Company of the Carquinez Straits Bridge, California, and of design and engineering of the San Francisco–Oakland Bay Bridge.

Dr. Goodrich joined the Society as a Member in 1925. He served as a director of the Pittsburgh Section from 1938 to 1942, and was chairman of the Executive Committee of the Structural Division of the Society in 1940.

Charles F. Goodrich
Nominee for Director, District 6

He is also a member of the Engineers' Society of Western Pennsylvania, the American Society for Testing Materials, the Thayer Society of Engineers (of which he has been president), and of the American Welding Society. He is also actively engaged in work on several committees of the American Institute of Steel Construction, of which his company is a member. Another interest is the Thayer School; he is now serving on its Board of Overseers.

NATHAN W. DOUGHERTY

NATHAN W. DOUGHERTY was born at Hales Mill, Va., and received his early education in the public schools of Virginia and Tennessee. He then attended the University of Tennessee, receiving the degree of bachelor of science in civil engineering in June 1909. In the fall of 1910 he entered Cornell University as a student and, at the same time, began his career as an instructor in civil engineering. He received two degrees in civil engineering from Cornell.

In 1914 he was offered an assistant professorship in civil engineering at George Washington University, but in 1916 returned to his alma mater, the University of Tennessee, as associate professor of civil engineering. In 1919 he was promoted to a full professorship, remaining in that capacity until he was appointed dean of engineering in 1940.

During his teaching years Professor Dougherty was active in the field of highway and railway engineering. During the summers of 1921 and 1922 he was employed by the Public Roads Administration (then the U.S. Bureau of Public Roads) to do some special traffic studies in Tennessee. During the summer months from 1923 to 1937 he acted as special assistant to the Commissioner of Highways and Public Works of Tennessee.

He became an Associate Member of the Society in 1919 and a Member in 1922. In 1933, when there were enough engineers in Knoxville to support a Local Section of the Society, he assisted with the organization of a Local Section and was elected the first president of the group. During his administration the foundations were laid for the Tennessee Valley Section.

NATHAN W. DOUGHERTY
Nominee for Director, District 10

Professor Dougherty had a discussion on "Highway Traffic" in the 1930 TRANSACTIONS of the Society, and several articles in CIVIL ENGINEERING—among them "Modern Engineering Colleges" (May 1935); "The Hall Marks of an Engineer" (April 1937); and "Shall We Teach Culture?" (March 1940).

Since 1917 Professor Dougherty has been chairman of the Athletic Board of Control of the University of Tennessee. He has been a member of the State Board of Registration for Architects and Engineers in Tennessee since its organization in 1921, and chairman since 1927. In addition to his Society affiliation, he is a member of the American Association for the Advancement of Science, the Society for Promotion of Engineering Education, the Newcomen Society of America, the Tennessee Academy of Science, and the Knoxville Technical Society. He is also representative for the National Council of State Boards of Engineering Examiners on the Engineers Council for Professional Development.

FRED C. SCOBEY

FRED C. SCOBEY was born in Greensburg, Ind., on January 20, 1880, and grew up in Denver, Colo. Though scheduled for graduation at Stanford University in 1902, lack of funds postponed this action for many years. However, Mr. Scobey finally graduated "with distinction" with a degree of B.A. in civil engineering. After a year with the city engineer of Denver, he spent the years 1902 to 1906 in railroad, drainage, and reservoir surveys, and construction. In 1905 he was appointed state engineer of Mississippi, his work including the mapping and layout for drainage and other improvements for four state farms. From 1906 to 1909 Mr. Scobey was associated in various engineering capacities with E.D. Shepard and Company, of New York, operating in and around Raton, N.Mex.

In 1909 and 1910 he was engineer on hydraulic studies for the many irrigation companies that later organized the present Imperial Irrigation District. In the fall of the latter year he accepted appointment in the Irrigation Investigations of the U.S. Department of Agriculture, and for some twenty years was senior irrigation engineer specializing in the hydraulics of canals, pipes, and structures. As a result of this research work he was the author of Department bulletins on The Flow of Water in Irrigation and Similar Canals; The Flow of Water in Wood Stave Pipe; The Flow of Water in Concrete Pipe; The Flow of Water in Riveted Steel and Analogous Pipe; and The Flow of Water in Flumes.

FRED C. SCOBEY
Nominee for Director, District 13

In 1934 Mr. Scobey planned, conducted the field work, and prepared the report on The Extent of Land Use Under Irrigation for the National Resources Planning Board. In 1936 and 1937 and, again, in 1939–1941, he was principal irrigation engineer on interstate river investigations, representing the Department of Agriculture and the National Resources Planning Board. Since 1935 he has been technical adviser to the U.S. Commissioner (L. M. Lawson, Hon. M. Am. Soc. C.E.), International Boundary Commission at El Paso, Tex.

Mr. Scobey was elected Associate Member of the Society in 1913 and a Member in 1921. He has served as secretary and chairman of the Irrigation Division, and member and chairman of the Society's Committee on Research. He organized the Hydraulics Division in 1938 and has been chairman ever since. He was a member of the Committee on Irrigation Hydraulics for its duration (1921–1932), and has been a member of the Technical Procedure Committee since 1930, with the exception of the year 1938. In 1939 and 1940 he was a member of the Executive Committee of the Technical Procedure Committee. In 1938 he was elected vice-president of the San Francisco Section.

His other professional affiliations include membership in the American Society of Agricultural Engineers, the American Society of Photogrammetry, Sigma Xi, Tau Beta Pi, and Chi Epsilon. He is a registered engineer in the state of California.

Cancellation of Dues Helps Members in Armed Services

APPRECIATION of sacrifices made by members of the Society in the armed forces of the United States is given practical form by the following action which was taken by the Board of Direction at its recent meeting:

> "Cancellation of 1943 dues is hereby extended automatically to all those members of the Society in the armed services of the United States who are Selectees; and, upon request for such cancellation, to those commissioned officers receiving base pay of $2,400 or less. Those who receive this exemption will continue to be listed as members of the Society and have prior unpaid dues canceled; and those who are Corporate Members shall retain their voting rights. However, no publications except CIVIL ENGINEERING are to be forwarded to those thus exempted."

The word "Selectee" is to be interpreted as applying also to volunteers and to those in non-commissioned ratings. The forwarding of CIVIL ENGINEERING to those exempted, wherever they may be, so long as practicable, is a provision in extension of procedures which have prevailed previously.

The number of members in the armed services is increasing and thus the new provisions will have a continually widening application. Simultaneously, of course, the Society's income will be reduced and necessarily this will find reflection in the curtailment of certain operations which otherwise would have gone forward as in normal times. The decision to hold no Spring or Fall Meeting of the Society is one curtailment already decided upon. Others will be decided upon when the budget is adopted at the time of the Annual Meeting.

It is probable that no one will regret the curtailments that will be deemed necessary to relieve those members in the lower ranks of military service of some of their financial worries.

Meeting of the Board of Direction—Secretary's Abstract, October 12, 1942

THE BOARD of Direction met at the General Brock Hotel, Niagara Falls, Ontario, Canada, on Monday, October 12, 1942, with President E. B. Black in the chair, and Secretary Seabury and the following members of the Board in attendance: Past-President Fowler; Vice-Presidents Burdick, Stevens, Spofford, and Stanton; and Directors Boughton, Carey, Cowper, Cunningham, Dickinson, Dunnells, Goodrich, Howard, Hyde, Lilly, McNew, Massey, Polk, Rawn, Requardt, and Wiley.

Regrets were received from Past-President Hogan and Directors Blair, Burpee, and White.

Approval of Minutes

Records of the meeting of the Executive Committee on July 19 and of the Board on July 20, 1942, as given in the minutes of those meetings, were approved.

Executive Committee

A number of items were received from the Executive Committee, which were approved, or considered in detail with independent action, or otherwise disposed of. Such actions are recorded herein as business of the Board.

Nomination for President

Following a meeting of the Nominating Committee, it was reported that the choice of President of the Society for 1943 fell to Ezra Bailey Whitman, M. Am. Soc. C.E., of Baltimore, Md. Subsequently his acceptance of such nomination was also received. Note of Mr. Whitman's nomination was given in the November issue.

Five New Honorary Members

Following canvass of ballots, it was announced that five members of the Society had been elected as Honorary Members, including: Alonzo John Hammond, Lawrence Milton Lawson, Ben Moreell, Brehon Burke Somervell, and Sherman Melville Woodward. See November CIVIL ENGINEERING for brief comments on these new Honorary Members.

Amendment to By-Laws—Selection of Division Executive Committee Members

Following due procedure, an amendment to the By-Laws, Article VIII, Section 3, was taken up for final action. The object of the amendment was to simplify the designation of members of the Division executive committees, by omitting the requirement for an intervening Division nominating committee. The amendment was adopted so that the By-Law now provides:

"The members of the Executive Committees shall be appointed by the Board from nominations made by the Division Executive Committees."

Appointments to Division Executive Committees

Acting upon recommendations of the Divisions, the Board chose new members on the executive committees of the various Divisions to take the place of those members whose terms are to expire in January 1943, or who are retiring for other reasons. A list appeared in the November 1942 issue, page 639, which should be supplemented by the appointment of Charles M. Upham to the executive committee of the Highway Division.

Society Prize Winners, 1942

Confirming the selections of the Committee on Society Prizes, the Board made provisions for awarding all these honors, as follows:

KARL TERZAGHI, M. Am. Soc. C.E., the Norman Medal for his paper, "General Wedge Theory of Earth Pressure."

CHARLES F. RUFF, M. Am. Soc. C.E., the J. James R. Croes Medal for his paper, "Maximum Probable Floods on Pennsylvania Streams."

SHORTRIDGE HARDESTY, M. Am. Soc. C.E., and ALFRED HEDEFINE, Assoc. M. Am. Soc. C.E., the Thomas Fitch Rowland Prize for their paper, "Superstructure of the Theme Building of New York World's Fair."

W. WATERS PAGON, M. Am. Soc. C.E., the James Laurie Prize for his paper, "Transatlantic Seaplane Base, Baltimore, Md."

WILLIAM J. WILGUS, Hon. M. Am. Soc. C.E., the Arthur M. Wellington Prize for his paper, "The Grand Central Terminal in Perspective."

JOHN F. CURTIN, Jun. Am. Soc. C.E., the Collingwood Prize for Juniors for his paper, "Bridge and Tunnel Approaches."

ROBERT T. REGESTER, M. Am. Soc. C.E., the Rudolph Hering Medal for his paper, "Problems and Trends in Activated Sludge Practice."

FREDERIC R. HARRIS, M. Am. Soc. C.E., the Construction Engineering Prize for his paper, "Evolution of Tremie-Placed Dry Docks."

A number of these were listed on page 637 of the November issue.

Dues Obligations for Men in the Service

In recognition of Society obligation to men in the service, the Board revised provisions for the treatment of such men as regards dues and publications. For emphasis, the establishment of this "armed service list" is made the subject of an independent item elsewhere in this number. Action on members in various categories as regards obligations to the Society was also taken independently group by group.

Society Meetings, 1943

Various possibilities for regular Society meetings in 1943 were presented. After full discussion it was the decision of the Board that no Spring or Fall Meeting would be held next year; and that the place of the 1943 Convention during the summer is to be determined at the January meeting of the Board.

Financial Matters

Various questions of finances, securities, and working funds were presented, with appropriate action by the Board.

Committee Reports

Reports were received from the Committees on Publications, Districts and Zones, Post-War Conditions, Salaries, Employment Conditions, Washington Activities, and others. Conclusive actions taken as a result of committee reports are recorded elsewhere in these minutes.

Membership

Recommendations of the Committee on Membership Qualifications were received, and after full discussion action was taken covering 66 applications for admission and transfer.

Readmission to the Society

Problems involving admission of former members of the Society were presented by the Committee on Membership Qualifications. As a result of full discussion, revision of the present procedure was approved, in order to simplify and expedite such readmissions.

Foreign Exchange

It was reported that many active Society members are natives of Central and South America, from whom payment of dues is feasible although at an unfavorable rate of exchange. It was decided to continue the present practice of sharing equally with such members the adverse rates, accepting payment at the average of the United States and foreign money values.

Professional Conduct

One case of alleged unprofessional practice was taken up in detail at the instance of the Committee on Professional Conduct.

Joint Defense Activities

History of the Engineers Defense Board, in which the Society has cooperated, was reviewed and suggestion was received that this work might be transferred to a new Engineers War Board. Final action was to the effect that the Engineers Defense Board might well be dissolved, and further that the Society does not wish to engage in the joint support of a secretariat with office in Washington.

South American Engineering Comity

Communications were received from the Asociacion de Ingenieros de Chile and from the Asociacion de Tecnicos del Peru. In reply the Board authorized action on the part of the Society indicating engineering solidarity with these South American organizations.

Death of George S. Davison

Notice of the death of George S. Davison was received with regret, and a committee was authorized to prepare a memoir for publication by the Society.

Joint Committee on Cement and Concrete

It was reported that the Society had participated in extensive work of a Joint Committee on Standard Specifications for Concrete and Reinforced Concrete. As the work of this committee now seems to be completed, the Board acceded to its request for discharge, adding its sincere thanks.

Other Matters

Various items were presented, involving Society committees and other activities. After exchange of views, appropriate action was taken in each case.

Adjournment

The Board adjourned after 11 p.m., to meet at Society Headquarters on Monday, January 18, 1943.

United Engineering Trustees Elects Officers

OFFICERS elected for the United Engineering Trustees, Inc., for the coming year have recently been announced. Albert Roberts, mining engineer of Summit, N.J., and Secretary of Minerals Separation for the North America Corporation, New York, has been reelected president. He is active in the affairs of the American Institute of Mining and Metallurgical Engineers and is one of its representatives on the board of the United Engineering Trustees, Inc.

Others elected were: as vice-president, F. Malcolm Farmer, vice-president of Electrical Testing Laboratories; as vice-president and treasurer, Arthur S. Tuttle, Hon. M. Am. Soc. C.E., consulting engineer; and as assistant treasurer, W. D. B. Motter, Jr., assistant to the vice-president of the Chile Exploration Company. John H. R. Arms was reelected secretary.

United Engineering Trustees, incorporated in 1904, administers the Engineering Societies Building, the Engineering Societies Library, and endowment funds for the Engineering Foundation (the research organization acting for the four Founder engineering societies—Civil, Mining and Metallurgical, Mechanical, and Electrical). The corporation was established in 1904 to "advance the engineering arts and sciences in all their branches, to further research in science and engineering, and to maintain a free public engineering library."

Society Membership Passes 18,000

ALMOST on the ninetieth anniversary of the Society, the total number of members passed the 18,000 mark. The exact date was October 27, as compared with November 5 for the anniversary.

About a year ago (November 1941 issue) CIVIL ENGINEERING was able to announce that the membership had topped the 17,000 mark. It is obviously gratifying to be able to report so soon a further achievement in this direction.

This may not be the first time the membership has nominally exceeded 18,000 but it is the first occasion for which credit can properly be taken. The total membership is always a composite of the current accessions and withdrawals or other losses. The minus figures tend to come at certain dates, usually at times of the year when members must be dropped for non-payment of dues. To take the number just prior to such deductions is manifestly unfair.

But the present figure does not involve this inaccuracy. The regular losses through non-payment occurred in September, and still the membership is over 18,000. Therefore it is entirely legitimate at this time to feel satisfaction on entering another major bracket, so to speak.

Lest anyone should think that this means the Society now has the benefit of over 18,000 dues-paying members, this assumption must be promptly dispelled. Many of our members of long standing are residents of foreign countries with which we have no contacts because of war conditions. While they are still considered as members, they are not able, nor are they expected, to carry the financial burden of membership. Then there is a much larger group of men in uniform who have been exempted from payment of dues for the duration. This group is growing with the enlargement of the national defense forces.

The new high mark in Society membership, achieved in a time of emergency, may well be a source of gratification. Certainly it must be considered as indicating a growing appreciation of the benefits of professional contacts and associations.

Death of J. B. Lippincott, Honorary Member

THOSE who knew J. B. Lippincott—and his engineering friends were legion, especially in the West—will be surprised and shocked to hear of his death on November 4 in Los Angeles, at the age of 78. The tone of his correspondence, until the very end, was such as to give no hint of his failing in any degree.

His services to engineering were manifold. In southern California he counted his experience in decades—over five, to be exact. His personal attributes, plus a splendid reputation for the quality of his engineering work, made Mr. Lippincott a popular choice for Honorary Member in 1936.

J. B. LIPPINCOTT, 1864-1942, HONORARY MEMBER OF THE SOCIETY

Water in its various relations to civilization was the main concern of his professional life. First he served with the U.S. Geological Survey; then with the U.S. Reclamation Service, and finally with the Los Angeles Aqueduct. It was here that he worked with William Mulholland, whom he sincerely admired and whom he memorialized in a splendid series of articles in CIVIL ENGINEERING in 1941.

For the past thirty years Mr. Lippincott maintained an office in Los Angeles as consultant, specializing in water supply and irrigation. These services took him not only throughout the United States but to Mexico, Alaska, and Hawaii. He also gave freely of his time to civic duties.

In the Society he was long active. With others he was largely responsible for the founding of the Los Angeles Section, and he served as its first president. He was active also in the Irrigation Division of the Society. In 1914 he received the J James R Croes Medal.

It was as "J. B." that he was known to engineers far and wide. They will miss his fine company, his sterling character, and his warm personality. The Society loses one of its staunchest members.

Manual on Military Roads for Students

A MANUAL on "Military Roads in Forward Areas" was issued last year and made available to all members of the Society, as well as to a large number of engineers in military service. This manual has been available for sale through the Headquarters office of the Society.

It is now suggested that students may have use for this valuable material. Accordingly, at the instance of the Executive Committee of the Highway Division, arrangements have been made to place a special price on it for purchasers in this category. A price of 50 cents a copy has been set, which is lower than that for general sale. Therefore it is necessary to restrict this offer to members of the Society's Student Chapters. Orders may be placed through the Headquarters of the Society, 33 West 39th Street, New York, N.Y.

Hoover Medal Goes to Gerard Swope

ANNOUNCEMENT has been made of the selection of Gerard Swope, president of the General Electric Company, as the sixth recipient of the Hoover Medal. The Medal will be presented to Mr. Swope during the winter convention of the American Institute of Electrical Engineers, the citation reading "engineer and distinguished leader of industry, ever deeply interested in the welfare of his fellowmen, whose constructive public service in the field of social, civic, and humanitarian effort has earned for him the Hoover Medal for 1942."

A native of Missouri, Mr. Swope graduated from the Massachusetts Institute of Technology in 1895. He then became connected with the Western Electric Company, and during the first World War served on the Army General Staff as assistant director of purchase, storage, and traffic. For his work he was awarded the Distinguished Service Medal and was made a Chevalier of the French Legion of Honor.

In 1919 when the International General Electric Company was organized, Mr. Swope was made president of the new organization. In 1922 he was elected president of the General Electric Company, serving in that capacity until January 1, 1940. On the latter date he resigned to become chairman of the New York City Housing Authority. Later he served as assistant to Secretary of the Treasury Morgenthau. In September 1942 he was again elected president of General Electric.

Established in 1930 in honor of Herbert Hoover, the Medal is administered by the Hoover Medal Board of Award, consisting of representatives of the Four Founder Societies. Previous recipients have been Herbert Hoover, Ambrose Swasey, and John F. Stevens, all Honorary Members of the Society; Gano Dunn, M. Am. Soc. C.E., and D. Robert Yarnall.

Election of Officers and Other Activities of E.C.P.D.

TWO MORE colleges were recently added to the list of those whose engineering courses are accredited by the Engineers' Council for Professional Development. These two colleges are Notre Dame and the University of Toledo. At Notre Dame, curricula in aeronautical, civil, electrical, mechanical, and metallurgical engineering have been accredited; and at the Toledo school, the course in general engineering. Additional curricula have also been inspected and accredited by the Council at 12 other colleges.

The increased importance and popularity of chemical engineering is attested by the fact that one-third of the 20 new curricula accredited are in that category. Aeronautical engineering, another comparatively new field, is recognized in approved courses at two schools; and the comparatively rare curricula in ceramic and geological engineering have one representative each in the list of 20. A total of 577 engineering curricula in 131 colleges and universities in the continental United States have now been accredited in the last decade by E.C.P.D., through the inspection program of its Committee on Engineering Schools. Only degree-granting schools are considered.

At the recent tenth annual meeting of the Council, R. E. Doherty, president of Carnegie Institute of Technology, was reelected chairman. Other officers elected were S. D. Kirkpatrick, editor of *Chemical and Metallurgical Engineering*, vice-chairman; A. B. Parsons, secretary of the American Institute of Mining and Metallurgical Engineers, secretary; and S. L. Tyler, executive secretary of the American Institute of Chemical Engineers, assistant secretary.

Committee chairmen, representing the Council's four fields of work, were named as follows: Committee on Student Selection and Guidance, A. R. Cullimore, president of Newark College of Engineering; Committee on Engineering Schools, D. B. Prentice, president of Rose Polytechnic Institute; Committee on Professional Training, Everett S. Lee, engineer, general engineering laboratory, General Electric Company; and Committee on Professional Recognition, Charles F. Scott, of New Haven, Conn.

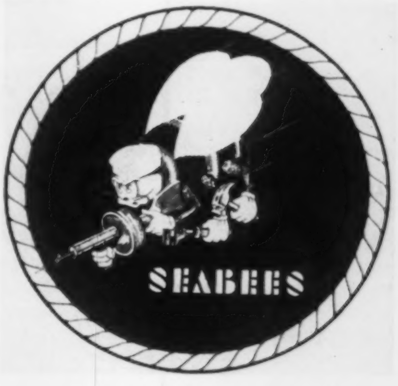
Engineers' Council for Professional Development includes the following national organizations: American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, Engineering Institute of Canada, American Institute of Chemical Engineers, Society for the Promotion of Engineering Education, and the National Council of State Boards of Engineering Examiners.

Objectives of the Council are to coordinate and promote efforts to attain higher professional standards of education and practice, greater solidarity of the engineering profession, and greater effectiveness in dealing with technical, economic, and social problems. Headquarters are maintained in the Engineering Societies Building, 29 West 39th Street, New York, N.Y.

Openings in Construction Corps, U.S. Naval Reserve

THE Navy Department has an immediate need in Construction Battalions (Sea Bees) for officers experienced in field construction work of all kinds—from roads to dams and barracks. Successful applicants will be appointed in grades of Warrant Officer, Ensign, Lieutenant (jg), Lieutenant, and a few in the grade of Lieutenant Commander.

The main qualifications, which cannot be emphasized too strongly, are the individual's ability to head up a crew of men and build a road, barracks, or warehouse anywhere in the world; plus the ingenuity to build it out of whatever material is available, and with whatever equipment is at hand; and an essentially rugged physical condition that "can take it." These qualifications will transcend all other considerations, and for the right man waivers will be granted for nonorganic physical defects, age, and lack of a technical degree, which is desirable but not necessary. Six years' field experience will be considered in lieu of a technical degree.



INSIGNIA OF THE SEA BEES

No draftsmen are needed at the present time, or architects as such; but men possessing degrees in architectural engineering, who have had field experience supervising any type of construction, will be given all possible consideration. Full members of the American Society of Civil Engineers are considered an excellent source of supply.

Generally speaking, men under 30 do not possess the required field experience, and should have a degree; the same is true in a lesser extent for men between the ages of 30 and 35; but above 35, the professional record will be given more consideration than the educational background. Warrant officers will have good opportunity for advancement after demonstration of their ability.

In general, men with the following experience will be considered for appointment as indicated, subject to the usual requirements for grade:

Field construction foreman	Warrant officer
Field construction section chief	Ensign or Lt. (jg)
Field construction superintendent, plus construction administrative experience	Lieutenant
Field construction superintendent on large projects, plus considerable construction administrative experience	Lieutenant-Comdr.

Age limits are 21 to 50. Waivers may be granted on the upper age limit, provided the applicant is in good physical condition and possesses all other necessary qualifications.

If applicants are able to meet other qualifications, every consideration wll be given to physical waivers. The duty to be performed by these officers requires a generally rugged type of individual, and a minimum height of approximately 5 ft 6 in. is essential.

Inquiry may be made to local naval officers, or direct to Comdr. John S. Leister, M. Am. Soc. C.E., who is personally interested in expediting appointments of suitable candidates. He may be addressed at the Bureau of Yards and Docks, Washington, D.C.

Designation of Military Titles

IN THE extensive growth of the Army and Navy, engineers have had a large share, and their number in the armed services has grown by leaps and bounds. Since a large percentage of these men are members of the Society, the question has arisen as to the proper use of official titles.

This matter was complicated by the retention, often as a matter of courtesy, of similar titles held over from the last world war. The result was a certain amount of confusion between titles indicating present active service, former reserve titles, and similar designations. After considering this situation, the Society's Publications Committee felt it desirable to limit the use of military titles to those now actively holding them or to those who formerly were officers in the regular armed forces. Accordingly the Committee has adopted the following revised rule:

> "In Society publications, military titles will be reserved solely for those in present active service and for those retired from regular Army or Navy service."

Titles of officers in the U.S. Coast and Geodetic Survey are to follow regular Navy usage, in accordance with the Survey's practice. It is believed that these provisions will make for simplicity as well as accuracy.

John Fritz Medal Awarded to Willis R. Whitney

THE John Fritz Medal, often referred to as the highest award of the engineering profession, is devoted to the recognition of distinguished contributions in the field of applied science. This year the award goes to Willis Rodney Whitney "for distinguished research both as an individual investigator and as an outstanding and inspiring administrator of pioneering enterprise, coordinating pure science with the service of society through industry."

Born in Jamestown, N.Y., in August 1868, Doctor Whitney was graduated from the Massachusetts Institute of Technology and the University of Leipzig. He taught for some years at the Massachusetts Institute of Technology, and since 1908 has been nonresident professor of chemical research. In 1900 when the research laboratories of the General Electric Company were established at Schenectady, N.Y., Dr. Whitney was appointed director of research. He became vice-president of the company in 1928, and vice-president in general charge of research in 1932. His most notable achievement has been the creation and development of the General Electric research laboratory, one of the earliest of its kind in the United States.

The Board of Award consists of four past-presidents of each of the Four Founder Societies. Previous recipients of the Medal include Thomas A. Edison, George W. Goethals, Orville Wright, Guglielmo Marconi, and Herbert Hoover.

Welcome Extended by the Institution of Civil Engineers in England

A RECENT letter from E. Graham Clark, Secretary of the Institution of Civil Engineers, refers to American engineers temporarily in England, and to his meeting with Col. Cecil R. Moore in charge of U.S. Army engineering work there. Mr. Clark goes on to say:

> "I had been very anxious to establish some contact between the American Engineers and this Institution, in the hope that we might possibly be of some use to them in their present capacities. Of course the U.S. Army Engineers are scattered somewhat over the countryside, but I hope that some at any rate may be able to attend our meetings in London this coming winter, and those who are in other parts of the country may take advantage of the meetings held by our Local Associations in the provinces."

The Headquarters of the Institution, for those who may find it convenient to visit it, are in Great George Street, Westminster, S.W. 1.

John Edwin Greiner, Honorary Member, Dies

ANNOUNCEMENT has been received of the death on November 16 in Baltimore, Md., of John Edwin Greiner, Honorary Member of the Society. His death, at the age of 83, further reduces the number of those select few who have received the highest technical recognition in the power of the Society to bestow.

JOHN EDWIN GREINER, 1859-1942

As a result of his life work in bridge design and construction, Mr. Greiner might be considered the dean of American bridge engineers. His early experience started in 1880, with the Edgemoor and Keystone Works. Except for an interval with the Philadelphia Bridge Works, he then spent a long period in solving the bridge problems of the Baltimore and Ohio Railroad. In turn he filled various positions from draftsman to chief engineer.

Then in 1908 he went into private practice, heading his own firm. This later expanded to the J. E. Greiner Company, one of the largest in the East, of which he was president at the time of his death. To his attention came many important railway and highway structures, such as the recent ones over the Susquehanna and Potomac rivers.

For a period of 7 years following 1920 he was chairman of the Port Development Commission of Baltimore, planning a $50,000,000 program of improvements. A merchandise pier, one of the most important on the eastern seaboard, was completed under his direction. His connection with the Baltimore and Ohio Railroad Company continued after he entered private practice, as he was retained as consulting bridge engineer on all important work.

During the World War, Mr. Greiner was a member of the National Council of Defense. He also served on the American Railroad Commission sent to Russia by President Wilson. In this connection he passed on the strength and carrying capacity of all bridges on the Trans-Siberian and Russian Railway.

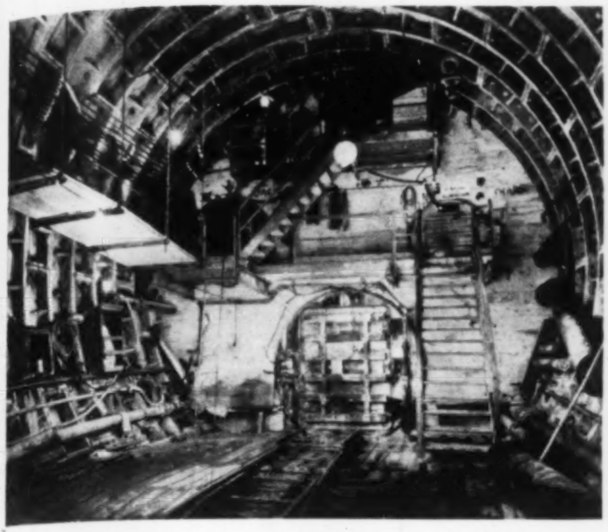
In the Society Mr. Greiner's connection goes back to 1890. He served on the Joint Committee on Specifications for Concrete and Reinforced Concrete, and on the Special Committee on Specifications for Bridge Design and Construction. In his more active days he was a frequent contributor to engineering publications and received both the Norman Medal (1896) and the James Laurie Prize (1915). On two occasions he was president of the Engineers Club of Baltimore.

In recognition of his accomplishments, his alma mater, the University of Delaware, conferred on him the honorary degree of Doctor of Science in 1917. But the greatest tribute to his success as an engineer came with his election to Honorary Membership in the Society in 1932. In his death, the ranks of structural engineers and consulting engineers have lost a notable member.

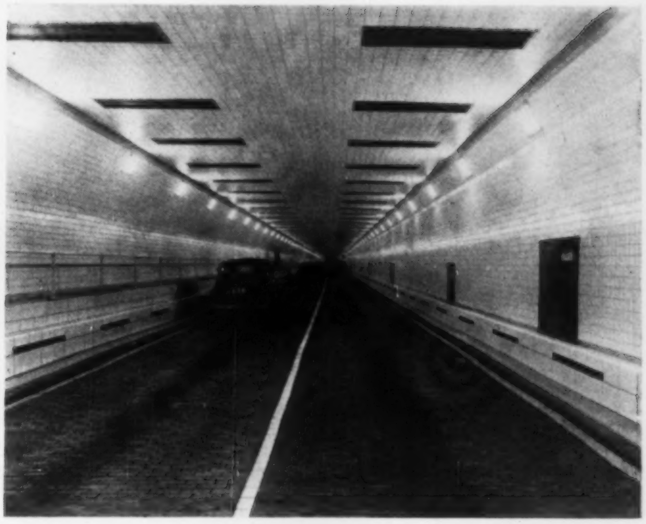
Staff Member Visits the Southwest

AS THIS ISSUE goes to press, Howard F. Peckworth, Assistant to the Secretary, is starting out on an extended trip through the Southwest to further the Society's efforts to improve employment conditions. He will meet with interested groups in Albuquerque, N. Mex., and Phoenix, Ariz. From there he will go on to the Los Angeles District, where Members have requested advice regarding employment conditions governing the work of a group of engineers on one of the large war projects. He will be in that area during the first week in December.

At the completion of this assignment in the Los Angeles area, Mr. Peckworth will return through Salt Lake City. Thence he will go to Lawrence, Kans., where he will consult with the President of the Kansas Engineering Society regarding the work which that society is doing to protect the interests of employee engineers.



Pressure Side of Tunnel Bulkhead



Interior of One of the Completed Tubes

Slides from Lecture on Queens Midtown Tunnel, New York

Lantern Lectures Available for Student Chapters

Announcement was made on October 2 of the material available for the use of Student Chapters in the form of lantern slides, with mimeographed descriptions, covering a number of important engineering projects. They are sent to any Student Chapter (Local Section or other interested group) without charge.

The variety of subjects included in the series is shown in the following list:

- Aerial Photographic Mapping
- Bonneville Dam
- Boulder Dam
- Carquinez Strait Bridge
- Cascade Tunnel
- Catskill Water Supply
- Conowingo Hydroelectric Development
- Coolidge Dam
- Florianopolis Bridge
- Foundation Problems of West Side Elevated Highway, New York
- George Washington Bridge
- Golden Gate Bridge
- Grand Coulee Dam
- Hetch Hetchy Water Supply
- Holland Tunnel
- Miami Flood Control
- Mississippi River Flood Control
- Norris Dam
- Power Development at Niagara Falls
- Queens Midtown Tunnel
- San Francisco–Oakland Bay Bridge
- Tacoma Narrows Bridge Failure
- Wheeler Dam
- Wilson Dam at Muscle Shoals

The lecture on the Tacoma Narrows Bridge includes a motion picture showing the actual failure of the structure.

Reservations for all lectures should be made well in advance of the date when they are to be shown. Experience has proved that those who wait until the last minute are often unable to obtain the particular lecture desired.

As stated in the July and August issues of Civil Engineering, new lectures are being prepared, but as some members of the staff have left to enter the services, it has not yet been possible to complete them. Special notice will be sent to the secretaries of the Student Chapters as additional lectures are made ready for use.

Officers of the Engineering Foundation Announced

At the recent annual meeting of the Engineering Foundation, 29 West 39th Street, New York, officers for the coming year were elected. This is the research organization of the professional engineering societies (American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, and American Institute of Electrical Engineers).

Those elected were A. L. Queneau, metallurgist of the U.S. Steel Corporation, who was chosen chairman for the ensuing year; Kenneth H. Condit, Dean of Engineering, Princeton University, who was elected vice-chairman; Edwin H. Colpitts, formerly director of the Bell Telephone Laboratories, who was reelected director, and John H. R. Arms, who was reelected secretary.

The Executive Committee is headed by Mr. Queneau as chairman. Other members are Kenneth H. Condit, J. P. H. Perry, M. Am. Soc. C.E., vice-president of the Turner Construction Company, New York; Walter I. Slichter, Professor of Engineering, Columbia University; Charles E. Stephens, vice-president of Westinghouse Electric and Manufacturing Company; and John H. R. Arms, secretary.

Appointments to the Foundation's Research Procedure Committee include Dean Condit, chairman; E. M. T. Ryder, M. Am. Soc. C.E., Way Engineer, Third Avenue Railway System, New York; Harold E. Wessman, M. Am. Soc. C.E., Professor of Civil Engineering at New York University; W. M. Peirce, Chief of Research Division, New Jersey Zinc Company, Palmerton, Pa.; W. Trinks, Professor of Mechanical Engineering, Carnegie Institute of Technology, Pittsburgh, Pa.; and L. W. Chubb, Director of Research of the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa. A. L. Queneau was appointed to represent the Engineering Foundation on the Executive Board of the National Research Council.

Seventeen researches bearing on war work were endorsed by the Board of the Foundation for support by grants during its fiscal year 1942–1943. These include investigations in the fields of civil, mining and metallurgical, mechanical, and electrical engineering, covering various problems of soil mechanics and foundations, hydraulics, alloys of iron, critical-pressure steam boilers, fluid meters, cold rolling steel, insulating oils and cable saturants, and welding. The professional development of the engineer also received the recognition of the Board in the form of a grant towards the work of the Engineers' Council for Professional Development.

Origin of the Civil Engineer

Excerpt from Address by President Robert Moore, "Transactions" Vol. 48, 1902

"Historically, as we all know, the oldest profession is that of the priesthood. How to ward off evil spirits and propitiate the invisible powers has been one of the earliest studies of every people, and they who knew, or were believed to know, best how these ends might be accomplished, were differentiated into a separate class whose members became the custodians of all the learning then attained by men. The priests were the scholars, the learned men, of their time. As such they were the medicine-men, or physicians, the healing art being at first almost wholly a matter of incantation. As conservators of tradition, they became the arbiters in disputed matters, and thus the lawyers and judges. As the only learned men, they were, of course, the first teachers or instructors in letters.

"In important structural works, the first of which were largely temples, they were the natural leaders, and as such the first architects. And their early activity in the field of engineering may be seen in the fact that among the Romans—the most practical of nations—the high priests were styled pontiffs or bridge-makers, and the high priests was *Pontifex Maximus* or the chief bridge builder. And the oldest engineering society was no doubt that of the *Fratres Pontifici*, or the bridge-building brotherhood of Benedictine monks, who during the Middle Ages chose as their special work the building and repair of bridges."

Oldest in Existence

WE ARE indebted to a recent issue of the *News Bulletin* of the San Francisco Section for information on "the oldest living thing." The determination of this question is of popular interest and also has its engineering connotation.

A scientific urge led three men during the summer to take a long trip on foot up into the High Sierras. One was an engineer, N. A. Bowers, Assoc. M. Am. Soc. C.E. The *Bulletin* describes this "unusual quest":

"They went to make scientific determination of the age of something they suspected would be three times the age of the *Sequoia Gigantea*. They brought back photographs, measurements, and particularly core borings that show the age of an old juniper near Sonora Pass to be in excess of 6,000 years. Mr. Bowers describes the tree as 'a stately being before whom one stands as in the presence of a monarch—a great tree that was two-thirds its present size at the beginning of the Christian era.' Although almost 22 ft in diameter at ground level, this old tree tapers so rapidly that it is only 90 ft high. The sequoia are far larger, but the age of their oldest living member has been definitely established as 3,210 years."

Charles P. E. Schneider, Honorary Member, Dies

THE DEATH of Charles Prosper Eugène Schneider, on the 17th of the month, made the third death of an Honorary Member to be recorded during November 1942. News of M. Schneider's death was widely noted in the daily press, for he was a world figure. In the Society he had the honor of being the oldest Honorary Member in point of election.

Although his name sounded German, he was in fact thoroughly French, his family having originated in Alsace. In his native France he was regarded as a master of industry, through his long-continued presidency of the Schneider-Creusot Company, one of the largest manufacturers of munitions in the world. It is significant that his death should have occurred while his country was in military eclipse. His plant at Le Creusot was known throughout the world, during later years especially for its production of the famous French 75's.

Primarily, M. Schneider was an engineer and industrialist. For the period 1898–1910, he was member of the Chamber of Deputies. His primary activity, however, was manufacturing. His company was closely connected with the famous Skoda works in Czechoslovakia. This connection was established in 1920, when he bought a large interest in the Bohemian firm.

Outside of his own company, he had wide interests in heavy French industry. He was a leader in the Comité des Forges, the French steel combination, recently dissolved by the government. His company was a leader in the Union Européenne Industrielle et Financière, which was said to control almost 200 companies engaged in heavy industry, including ordnance firms in France as well as over 200 outside the country.

Popularly he was known as Eugène Schneider. This name came from his grandfather who was the founder of the firm. Thus Eugène Schneider, born in 1868, was the third generation in charge of the famous works at Le Creusot, which he brought to such a place of importance.

He came to the United States in 1919, and during the course of his visit received honorary degrees of Doctor of Science from Pittsburgh and Western Reserve universities, and of Doctor of Engineering from Stevens Institute. In the same year in which he was elected an Honorary Member of the Society, he received an even wider recognition in the award of the John Fritz Gold Medal. A committee of American engineers was delegated to present this to him in Paris on July 8, 1921.

In the death of M. Schneider, the Society loses its only Honorary Member from the mainland of Europe. All living Honorary Members are now citizens of English-speaking countries.

John H. Darling, 1847–1942, Leaves Bequest to Mortimer E. Cooley Foundation, University of Michigan

AS IS only fitting, the first sizable gift by will to the Mortimer E. Cooley Foundation, organized to receive and administer gifts and bequests to the College of Engineering, University of Michigan, has come from the son of a man who was instrumental in the establishment of scientific courses of study at that school. Henry Darling, as a member of the Michigan State Legislature in 1851, devoted much effort to the introduction of such a course at Michigan. His son, John Henry Darling, named the Cooley Foundation as residuary legatee of his estate.

In so doing he honors a celebrated engineer and an Honorary Member of the Society, Mortimer E. Cooley, for whom the Foundation was named. John H. Darling himself was keenly interested in both organizations—the Society and the University. He died on September 12 at his home in Duluth, Minn., where he was well known and greatly beloved, at the age of ninety-five. Even during his last year he carried on his correspondence as usual, typing his own letters.

He was born April 15, 1847, in Lake Ridge, Mich., and graduated in civil engineering at the University of Michigan in 1873. In 1915 the University conferred on him the honorary degree of Doctor of Engineering, primarily in recognition of his work in the study of magnetic variation on the Great Lakes. He was an engineer for the War Department for many years, and as U.S. Engineer at Duluth he designed and built the Duluth Harbor, together with other Lake Superior improvements.

After his retirement in 1913 he devoted his special attention to astronomy. He built the Darling Observatory, which he willed to the Duluth State Teachers' College, together with an endowment for its support. Since 1901 Mr. Darling has been a loyal member of the Society. He was active in professional matters, to which he gave much of his time, and was the loyal friend of many engineers.

Index for 1942 CIVIL ENGINEERING in This Issue

AS THE READER will no doubt notice, the index for all articles and items published in CIVIL ENGINEERING during the year 1942 has been bound in with this the December issue. This special service is rendered by the Society for those readers who keep their copies for later use. It is particularly handy when bound in with the twelve issues which it covers, but in any case it provides a means of ready reference to the material that has appeared in this publication during the year just ending.

The advantage of having the index come out with the December number, at the end of each volume, is especially evident if the twelve issues are to be bound before the end of the year. As the index is printed in a separate form, at the very back of this number, it is possible to remove it intact merely by unloosening the wire staples. It can then be either filed or bound with the 1942 volume. The first page is designed to constitute a fitting title page if the index is bound in the beginning of the volume. For those who may require them, separate copies of the index are available from Headquarters at the price of 15 cents each.

From an editorial standpoint, the difficulties of getting the index ready to appear in this issue, so as to include the number in which it appears, are obvious. However, the appreciation of many members, engineering offices, and libraries, who desire to make immediate use of it, shows that the additional labor is warranted.

News of Local Sections

Scheduled Meetings

Alabama Section—Two-day meeting at the Thomas Jefferson Hotel, Birmingham, on December 11 and 12, beginning 10 a.m., Friday, December 11.

Colorado Section—Dinner meeting at the University Club on December 14.

Dayton Section—Luncheon meeting at the Engineers' Club on December 21, at 12:15 p.m.

Indiana Section—Joint meeting with the Purdue Student Chapter in the Union Building, Purdue University, on December 8, at 6 p.m.

Kentucky Section—Annual meeting at Frankfort, Ky., on December 11, at 6:30 p.m.

Los Angeles Section—Dinner meeting at the University Club on December 9, at 6:15 p.m.; dinner meeting of the Junior Forum at the University Club on December 16, at 5:30 p.m.

Maryland Section—Annual meeting on December 8.

Metropolitan Section—Technical meeting in the Engineering Societies Building on December 16, at 8 p.m.; regular meeting of the Junior Branch in the Engineering Societies Building on December 9, at 8 p.m.

Miami Section—Dinner meeting at the Seven Seas Restaurant on December 3, at 7 p.m.

Nashville Section—Dinner meeting at the Vanderbilt University Restaurant on December 1, at 6:15 p.m.

Nebraska Section—Dinner meeting at Omaha, Nebr., on December 8, at 6:45 p.m.

Philadelphia Section—Dinner meeting at the Engineers' Club on December 8, at 6 p.m.—meeting at 7:30 p.m.

Sacramento Section—Regular luncheon meetings at the Elks Club every Tuesday, at 12:15 p.m.

St. Louis Section—Dinner meeting at the Forest Park Hotel on December 11, at 6:30 p.m.

San Francisco Section—Annual meeting at the Engineers' Club of San Francisco on December 15, at 5:30 p.m.

Spokane Section—Luncheon meeting at the Davenport Hotel on December 11, at noon.

Texas Section—Luncheon meeting of the Dallas Branch at the Dallas Athletic Club on December 7, at 12:10 p.m.; luncheon for the Fort Worth Branch at the Blackstone Hotel on December 14, at 12:15 p.m.

Utah Section—Dinner meeting at the Beau Brummel Cafe on December 2, at 6:30 p.m.

Recent Activities

Cincinnati Section

The Cincinnati Section held its October meeting at the University of Cincinnati, with a number of Student Chapter members as guests. Following a dinner at the Student Union, the speaker of the evening—R. T. Howe, plant engineer for the Cincinnati division of the Wright Aeronautical Corporation—was introduced. After discussing the subject, "Wright Builds for Air Supremacy," Mr. Howe showed slides that illustrated his description of the plant's construction program. Later the group enjoyed a 45-minute sound movie, showing the numerous operations involved in the construction, testing, and operation of the Wright airplane engine.

Cleveland Section

A talk on camouflaging industrial buildings, defense plants, hangars, and other structures was the feature of the October meeting of the Cleveland Section. This was given by Milton S. Fox, of the Cleveland Museum of Art. Mr. Fox, who is also chairman of the Civilian Camouflage Committee for the Cuyahoga County Council for Civilian Defense, pointed out that there are several methods of camouflaging: (1) To reduce the visibility of the object by making it blend into the landscape; (2) to change the appearance of the object by making it look like cultivated land or by simulating a wooded section; and (3) to use decoys or dummies to confuse the bombardier. Mr. Fox described one project that is so well disguised that he was lost for thirty minutes in one area.

Colorado Section

At the October meeting of the Section Alfred Merritt Smith, Nevada state engineer, addressed the group on the subject of magnesium production in Nevada. Mr. Smith discussed the large plant to be built at Las Vegas by the newly organized company, Basic Magnesium, Inc. "By careful alloying," Mr. Smith said, "the mechanical and physical properties of magnesium have been so improved as to make it available to industry as the lightest of all construction metals." The metal has many uses in industry, from castings for airplane engines to powder for incendiary bombs.

Connecticut Section

"Approach to the Planning of Cities" was the subject of discussion at the October meeting of the Connecticut Section, which was held in New Haven on the 8th. The principal speaker was Prof. Maurice E. H. Rotival, who illustrated his talk with slides taken from the work of Yale students. Professor Rotival's assistants, Messrs. Meyer and Downe, continued with a description of the proposed city plan for the city of New Haven. Charles S. Farnham, vice-president of the Section, was chosen as the Section's representative at the Niagara Falls Meeting.

Georgia Section

The October meeting—held jointly with the Georgia Engineering Society on October 5—proved the best-attended luncheon meeting the Section has had. There were 108 present. Maj. Walter S. McDonald, of the Atlanta Army Officers Procurement District, discussed the Army's needs for engineers, outlining the differences between the regular Army engineer officer and the officers of the Army Specialist Corps.

Earlier in the season members and guests of the Section enjoyed a picnic at the Lakemoore Club. Musical entertainment was furnished during the barbecued chicken supper, and afterwards all joined in singing, dancing, and games.

Ithaca Section

At the annual meeting, held on October 22, the following officers were elected for the coming year: George J. Watson, president; W. L. Malcolm and L. L. Huttleston, vice-presidents; and J. E. Perry, secretary-treasurer. An interesting and timely talk on South America was the feature of the technical program, the speaker being Emerson Hinchliff, of the romance language department at Cornell. Mr. Hinchliff has spent years in South America and was consequently in a position to describe many phases of life in the twenty republics of South America. Preceding the meeting, there was a dinner for eighteen members and five guests, including the officers of the Cornell Student Chapter.

Los Angeles Section

On October 14 Edmund Besselievre addressed a meeting of the Section on the status and progress of general sanitation in the Argentine. Mr. Besselievre, who has for a number of years been technical expert for the Dorr Company in the Argentine, pointed out that Argentinian ideas of sanitary engineering are European and quite backward. "The country has little or no knowledge of American practice," he said, "and does not care to find out." Mr. Besselievre also discussed some of the reasons for present differences between the policies of the Argentine and those of the United States. A brief talk by Ross Miller, of the National Resources Planning Board, concluded the program. Mr. Miller's subject was "Post-War Public Works Planning."

Metropolitan Section

A talk on "Modern Timber Design and Fabrication," given at the October meeting, initiated the Metropolitan Section's new season. The speaker was Verne L. Ketchum, chief engineer of Timber Structures, Inc., of Portland, Ore. With the aid of excellent pictures, Mr. Ketchum discribed in detail the various processes involved in prefabricating lumber and timber from a large Douglas fir log, which cut to 40,000 fbm of lumber. He emphasized the part ring connectors have played in the extensive utilization of laminated timber in large structures. The effect of priorities on steel, reinforced concrete, and other materials was attested by the large audience and the enthusiastic discussion that followed Mr. Ketchum's talk.

MICHIGAN SECTION

At the first fall dinner meeting of the Section, which was held in Detroit on October 23, new officers were elected. These are Milton P. Adams, president; George W. Francis and Clair C. Johnston, vice-presidents; and George W. McCordic, secretary-treasurer. Comdr. D. P. Wells, of the U.S. Navy, was present and discussed the Navy's urgent need for civil, electrical, and mechanical engineers. Civil engineers with broad construction experience are especially needed, he said. The other speaker was C. M. Goodrich, consulting engineer for the Canadian Bridge Company, who discussed the work done by engineers during the first World War.

MID-MISSOURI SECTION

The fall meeting of the Mid-Missouri Section was held jointly with a session of the Missouri Society of Professional Engineers in Jefferson City on October 23. The technical program consisted of talks by F. L. Filby, principal assistant engineer for Black and Veatch, of Kansas City, Mo., who disscussed the consulting engineer's place in the war effort; Col. R. C. Williams, of the Corps of Engineers, whose subject was "Engineers and the Present Emergency"; Hugh Stephens, administrator for the State Council of Defense, who discussed the role of the engineer in civilian defense; and Leslie A. Pettus, division engineer for the St. Louis (Mo.) Board of Public Service, who spoke on engineering problems in Australia and the Southwest Pacific. All of the speakers are in war work and based their talks on actual experience. In the meantime, a special luncheon and tour of the state Capitol had been arranged for the lady guests. In the evening the two groups met for a dinner dance.

NORTHEASTERN SECTION

On October 21 the Section and the Boston Society of Civil Engineers sponsored the annual Student Night, which was attended by students from all the Society's Chapters in New England. Dean Burden, president of the Section, welcomed the 145 student representatives and extended the greetings of the Society. A talk by Theodore R. Kendall, editor of the *Contractors and Engineers Monthly*, comprised the technical program. Mr. Kendall gave an illustrated lecture on war construction methods, his information having been collected on an extensive tour of the United States. He stated that many projects of the Army Engineers "clearly indicate the effectiveness and efficiency of our engineers and contractors in meeting the abnormal demands made upon them by war needs."

PHILADELPHIA SECTION

Members of the Philadelphia Section initiated the fall season with a dinner meeting, which was held at the Engineers' Club on October 13. President Adler opened the meeting with an address of welcome, reminding the members that the Section will need the whole-hearted cooperation of all during these war days. Maj. Lester L. Lessig then announced the formation of two new engineer companies, which will require men with highway construction experience. The speaker of the evening was Joseph O. May, engineer in charge of the Department of Estimates and Design of the American Bridge Company, whose subject was "Bridge Building, Past and Present." Mr. May traced the history of bridges from the first small natural bridges to the present-day suspension, arch, and cantilever structures, illustrating his talk with lantern slides. One of the slides depicted the Dizful Bridge in Iran, which dates back to the third century B.C. Oddly enough, there was a duPont engineer in the audience, who had actually seen and driven over the Dizful Bridge, and verified the fact that the arches used on this structure were pointed.

PITTSBURGH SECTION

On October 16 President Black and Secretary Seabury attended a dinner meeting of the Pittsburgh Section. The attendance of seventy included members of two Student Chapters in the vicinity. A brief résumé of the Niagara Falls meeting was given by C. F. Goodrich, Director-elect of the Society. Then President Black outlined important activities of the Society as related to the war effort in particular. He was followed by Mr. Seabury, who amplified certain of President Black's outlines.

SACRAMENTO SECTION

At one of the October luncheon meetings of the Sacramento Section Lt. Jack S. Barrish—a Section member, who is now in the U.S. Engineer Department—discussed the "Problems Encountered in the Design and Construction of Utilities as Used in Army Installations." The U.S. Engineer Department has gained considerable experience since it took over this work in 1940, bucking an uphill task that has been complicated by varying conditions, scarcity of materials, and changes in plans. In general, however, satisfactory results have been obtained in furnishing water, sanitary, and similar services. The annual Ladies' Day, held on October 20, was well attended by members and their wives. On this occasion Dr. Nicholas Ricciardi, president of the Junior College, spoke on "The Individual's Responsibility in Our Democracy." His topic helped to carry out the theme of the meeting, which was dedicated to the members in the service.

SAN DIEGO SECTION

On October 22 members of the Section heard Dr. Carl Wilson, water technologist, speak on the treatment of water for human consumption. Milestones in the history of water analysis, Dr. Wilson pointed out, were 1854, when it was discovered that water might cause contagious disease; 1872, when bacteria were first discovered; 1898, when it was proved that the treatment of water would prevent disease; and 1912, when chlorine was introduced as a protective measure. He emphasized the fact that there are still great possibilities in the engineering field for providing an economical means of purifying water and controlling the activity of living organisms in reservoirs and pipelines that affect the water supply.

SAN FRANCISCO SECTION

At the regular bimonthly meeting of the Section, held on October 20, the technical program consisted of an address by William B. Herms, head of the division of entomology and parisitology at the University of California. Dr. Herms discussed the insect-transmitted tropical diseases that may affect American military operations in such tropical areas as the South Seas, the East Indian Archipelago, China, Africa, and the Middle East, and outlined measures for the control of the vectors of these diseases. He stressed the fact that the problem of control and prevention is one for the engineer as well as parisitologist and said that, through the efforts of the two groups working together, adequate control could be realized.

At the September meeting of the Junior Forum, talks were given by Gifford M. Randall, of the Kaiser Company, Inc., and J. M. Mullen, of the Shell Development Company. The topic for discussion was "Financing the War."

UTAH SECTION

The regular monthly meetings of the Utah Section were begun on October 7. A talk on "Ballistics and Loading of 20-mm and 37-mm Shells" comprised the technical program. This was given by Lt. Col. S. M. Strohecker, Jr., chief of the industrial division of the Ogden Arsenal, who displayed several different types of shells and their component parts. He explained that the work at the Ogden Arsenal is one of assembly only, all the parts and explosives being manufactured at other locations. Because of the shortage of man power there are only two eight-hour shifts. It was stated that more ammunition was manufactured in the first six months of the present war than during the entire period of the first World War. A round-table discussion concluded the program.

WISCONSIN SECTION

A symposium on the new Milwaukee Ordnance Plant was enjoyed at the October meeting of the Section. The principal speaker was Maj. R. L. Davis, of the Ordnance Department of the U.S. Army, who is now located at the plant. Major Davis gave a picture of the whole process of manufacturing small arms ammunition of calibers varying from 22 to 50, illustrating his talk by numerous examples of the various stages of manufacture. He was followed by Lt. Col. R. C. Gregory, area engineer at the plant, who discussed some of the construction difficulties encountered. Jerry Donohue, who is associated with the architect-engineer on the project, concluded the program with a discussion of the problems of water supply and sewage treatment.

Student Chapter Annual Reports

Abstracts of 1941–1942 Reports from the Southern and Eastern Districts as Provided by the Society's Committee on Student Chapters. Abstracts from the Western and Northern Districts Appeared in the November Issue

University of Alabama

The University of Alabama Student Chapter has accomplished its purpose for the 1941–1942 school year. Student participation and interest have been good, and many educational benefits were derived from the programs. Lectures, motion pictures, and discussions were featured at the various gatherings, to which visitors were always welcome. Many practicing engineers, faculty members, and non-affiliated students attended the meetings, with resultant benefits to the students. Inter-Chapter association helped to foster good-fellowship and fraternal feeling.

University of Arkansas

This year the members of the University of Arkansas Chapter began the school year determined to have interesting meetings. We decided to have more guest speakers and to change the plan of presenting seminar papers. As it is practically impossible, because of our location, to obtain outside engineers as speakers, faculty members of other schools were asked to give talks. This method proved highly successful, and some very interesting meetings resulted.

The Citadel (Military College of South Carolina)

The high light of the past year at the Citadel was the lecture on April 8 on "Aerodynamics of Suspension Bridges" by Dr. D. B. Steinman, New York consultant. While the lecture was given under the auspices of the Chapter, it was possible only because of the cooperation and help of the civil engineering department and the college administration. The major part of the expenses involved was paid by the college and the balance by the department. Also, the civil engineering and physics departmental staffs aided by supplying demonstration equipment and personnel. The attendance, which numbered over 500, included the whole civil engineering student body as well as many students from other electives, faculty members and their families, and engineers from the vicinity

Bucknell University

Bucknell University's war-time accelerated program for junior and senior engineers officially commenced the last week in January, with second-semester classes beginning the day following the final first-semester engineering examinations. Civilian defense activities and classroom work required more time of the civil engineering students thus affected, the work being concentrated so that the second semester could be completed by the second week of May. Another innovation was the Central Coordinating Committee of Bucknell Engineers, consisting of two students and one faculty representative from each of the four engineering groups on the campus. This organization resulted in better and more interesting programs than would be possible were the groups to act individually.

Early in January work was begun on the problems involved in the Chapter's position as host to the Eighth Annual Student Chapter Convention of the Philadelphia and Lehigh Valley Sections, which was held on Monday, April 20. Committees were chosen to provide for the details connected with program, housing, and publicity arrangements, each committee being composed of several student members, headed by a student chairman and aided by a faculty member. With such an organization the work of planning the program, securing speakers, and arranging for the various details of entertainment was efficiently carried out. The publicity committee prepared mimeographed maps of the best routes from the various schools to the place of meeting, as well as an enlarged map of Lewisburg, Pa., the home of the host Chapter. These maps accompanied the invitations that were sent out to Student Chapters

The College of the City of New York

Each spring the Dam Club of the College of the City of New York conducts its F. O. X. McLoughlin memorial prize paper competition. This year four papers were prepared by members of the City College Student Chapter, the participants being A. Gessow, W. Rabinowitz, J. Kapor, and M. Gruss. The award, consisting of the ten-dollar initiation fee for Junior membership in the Society, was won by Mr. Gessow. The latter's paper on "Construction Problems in the Outlying Bases" pictured the unusual conditions encountered by our engineers in Alaska, Hawaii, the West Indies, and other United States' bases. Many specific examples were given. Following the presentation of the papers the audience was invited to discuss the various topics. "This is always one of the most important parts of the program because the young men receive many ideas, hints, and corrections from the alumni present."

Duke University

The Duke University Student Chapter has just completed a very successful year. A number of meetings were held, and attendance was good at all of them. The programs featured student talks, which were illustrated with slides and moving pictures. At the annual "Sophomore Day," held in February, unusually fine talks were given by six of the sophomore members.

Missouri School of Mines and Metallurgy

The Chapter at the Missouri School of Mines is proud of its record of activities during the past year and of the fact that it is the most active organization on the campus. The Chapter is particularly appreciative of the efforts of Faculty Adviser E. W. Carlton, Prof. J. B. Butler, and the various speakers, who helped make the meeting programs interesting. Many of the graduating seniors joined the armed forces

Standing Room Only
Typical Meeting of the Missouri School of Mines Chapter

PRECISE CHAINING AT THE UNIVERSITY OF KENTUCKY
Student Chapter Members Hard at Work on College Campus

UNIVERSITY OF KENTUCKY

The 1941–1942 program of the University of Kentucky Chapter featured weekly meetings. The Society's illustrated lectures were enjoyed at some of these sessions, and members of the faculty proved interesting and cooperative speakers. On one occasion James E. Jagger, Field Secretary of the Society, discussed the benefits to be derived from membership in the Society. In May the annual banquet, sponsored by the Chapter and the University of Louisville Chapter, concluded the year's activities. In the competitive speaking contest, held at this time, the Kentucky Section awarded prizes to John D. Hancock and Earl Schaaf, of the University of Louisville, and C. E. Baierlein, of the University of Kentucky.

UNIVERSITY OF FLORIDA

Though the past year was not an exciting one for the University of Florida Chapter, it was interesting and successful. The program of activities got off to a good start early in October. It was at this meeting that foundations of friendliness and good will among the members were firmly laid. Each man stood, introduced himself, and gave a short résumé of his work during the past summer. Particular emphasis was placed on jobs held with engineering firms and on descriptions of any interesting projects observed during the vacation period. The men who were not employed in an engineering capacity during the summer were persuaded that the lack of such experience did not excuse them from giving a short biography. It was felt by the Chapter officers that this plan would net results at later meetings when new men would be called upon to express their views, and the results were gratifying.

GEORGE WASHINGTON UNIVERSITY

Planning programs for the first few Chapter meetings at George Washington University was not so successful as had been anticipated. There were several conferences of Chapter officers and committee chairmen, but none of the suggestions made for reviving the interest of the student body as a whole seemed to offer much chance of success. Then one of the new members said, "What we need is for every man in the Chapter to go out and talk personally with three or four of his fellow students. He ought to say, 'Bill, we want you to come to our next meeting. We have good programs, good times; you get to know your fellow civils, and you can help our school. We want you personally; so come on and promise me that you'll come.'" The scheme worked. Attendance picked up immediately, and by the end of the year we had not only the largest but one of the most interested Chapter groups that we have ever had in the university. I think we have all learned something about the proper way to approach people, too.

GEORGIA SCHOOL OF TECHNOLOGY

During the past year this Chapter has been very active and remains outstanding among the professional societies on the campus. Following the general custom at Tech of contributing to the social life of its members, the Chapter sponsored various social functions and banquets, and its athletic teams participated in many intramural sports. At the Chapter meetings various outside speakers gave inspiring talks on the profession. One of the most important steps of the year was the breaking up of the Chapter and its honorary chapter, Civil Crew, into two separate units. Membership in Civil Crew is to be attained only by scholarship, making it one of the highest honors a civil engineering student can win.

JOHNS HOPKINS UNIVERSITY

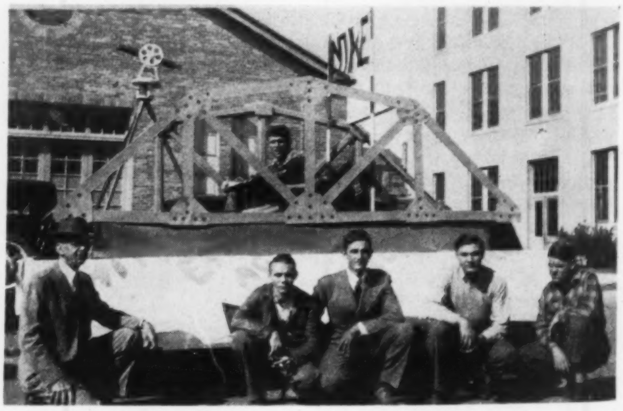
Although activities at Johns Hopkins during the past school year were naturally somewhat curtailed by the war, there was a great deal of interest in the Chapter. This interest was amply evidenced by the excellent attendance at the Chapter's meetings throughout the year and the large number of visitors present. In keeping with the precedent set by previous administrations, the Chapter has, during the past year, tried to present a varied program of engineering and non-engineering lectures. We feel that our efforts in this respect have been singularly successful and well rewarded by the enthusiasm with which they have been received.

UNIVERSITY OF MAINE

"The first meeting of the Civil Club for the year 1941 and 1942 was called to order by President Stanley Phillips. Students of the junior and senior classes gave résumés of their engineering experience during the previous summer. Those speaking were Richard Youlden, Paul Winslow, John Dimmer, and Elden Hall. The third meeting was open to members of other engineering courses, and its purpose was to bring students into contact with young engineers recently graduated from college. The speaker of the evening was Richard Payzant, resident engineer at the Bangor Airport, who talked on airport construction and work of the Army engineers. An informal discussion on what is expected of an engineering school graduate on his first assignment followed."

UNIVERSITY OF MARYLAND

This year emphasis was placed on greater individual participation in the activities of the Chapter. The benefits of the plan were twofold: There was greater interest among the members in the affairs of the Chapter, and this naturally resulted in increased attendance at the meetings. In an effort to increase attendance the publicity committee introduced two new features. Signs announcing the meetings were printed and displayed in prominent places in the engineering building, and mimeographed announcements of the meetings were also sent to each member. Results were highly satisfactory, as the attendance showed a marked improvement over recent years.



"HOMECOMING DAY" FLOAT MADE BY LOUISIANA STATE UNIVERSITY CHAPTER

LOUISIANA STATE UNIVERSITY

The most successful and best attended of all the activities of the Louisiana State Chapter are the field trips; this year the Chapter has been unusually fortunate in this respect. We visited a shipyard and an elevated highway under construction, a sewage treatment plant, and a water purification plant. We also had the opportunity to study several bridges in the process of construction, thereby getting an idea of the structural details and the methods of assembly and construction.

Massachusetts Institute of Technology

"In collaboration with the Massachusetts Institute of Technology student group of the American Society of Mechanical Engineers, the Chapter sponsored a program of moving pictures on the subject, 'Steel.' Starting early in December, one of the pictures was shown each week, the titles being 'The Manufacture of Steel Shapes,' 'Erection of the Golden Gate Bridge,' 'Streamlined Steel,' and 'Steel Wire.' Invitations to these showings were extended to all students at the college, and a very large attendance resulted. The pictures were furnished by the Bethlehem Steel Company."

University of Mississippi

The regular meetings of our Chapter have been varied and interesting. They have kept us in constant contact with the engineering world and its every-day practices, and we have learned a great deal. Our practice is to have the program chairman and Faculty Adviser arrange for as many speakers as possible. Upon arriving here the speaker is met by the Faculty Adviser and the dean. Later this group, together with the Chapter officers, dine at the college inn. Since we have meetings approximately every other week, it is sometimes impossible to obtain an outside speaker. At such times we have a speaker from the faculty or student body, or one of the Society's illustrated lectures.

University of Missouri

"This has been an interesting and momentous year for the University of Missouri Chapter. The trend of world affairs has emphasized anew the importance of the engineer to society. The Chapter feels that its existence is now more than ever before justified, and wishes to do everything it can to maintain the dignity and standing of the Society."

Northeastern University

"It is important that we re-introduce the Northeastern University Chapter. The Northeastern student is endowed with a seriousness of purpose, expressed both in his studies and his cooperative work, which makes for a natural and spontaneous interest in professional activity of any sort. This attitude has a great advantage in the promotion of Student Chapter affairs. On the other hand, there are several characteristics of the student's daily routine that make it difficult to carry on Society activities. About 85% of the students are commuters, so much of their day is spent in traveling to and from school. Due to the cooperative plan employed at Northeastern the ten-week periods spent in school are filled by heavy study schedules.... Only half of our membership is in school at one time, which eliminates from our meetings those students at work outside the Boston area. In spite of these obstacles, the students have a definite interest in Chapter activities and a desire to see the Chapter grow.

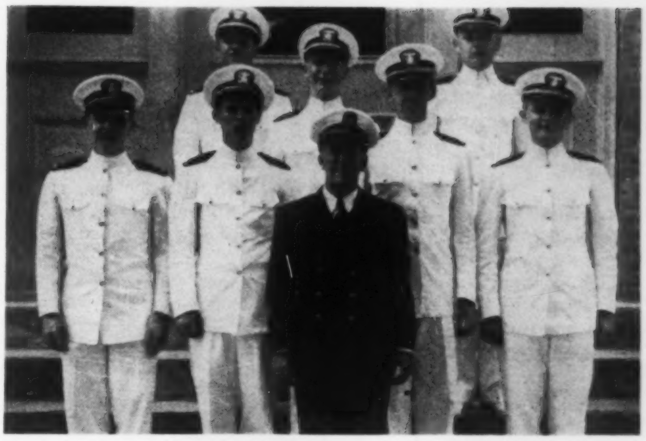
"In planning a program of activities...we adopted several specific aims for our year's activity which would make it possible for us to reach our goal. Our primary concern was the promotion of greater student participation in meetings by means of the presentation of student papers. This not only increases the student's interest in the Society but also gives both the speaker and his audience much valuable experience...."

"Spectator Sports" at North Carolina State College

The Student Chapter Holds Its Annual Picnic

North Carolina State College

With a better relationship between the Chapter and faculty members at North Carolina State College has come a series of better and more interesting programs, increased attendance at meetings, and the accomplishment of many things that would have been impossible without the aid of the faculty. A helpful innovation has been the holding of special meetings for officers, and there have been more social and technical gatherings than in the past.



The Graduating Class at Tulane University

All Eight Graduates Enter the Service as Naval Ensigns

Tulane University

This past year has been an eventful one at Tulane. As a result of the war the entire aspect of college life has changed. Under normal conditions civil engineering members of the graduating class would have found employment in engineering or industry. This year all eight graduates will enter the armed forces as ensigns in the Navy. Although the usual high scholastic requirements have been maintained, the program has been telescoped by the omission of holidays, including those at Easter and Mardi Gras. By this method it has been possible to complete the courses of study a month ahead of schedule. Censorship and war regulations have also restricted our outside activities. It is, for instance, impossible to visit many sites of wartime activity, and the taking of photographs is often forbidden. Existing conditions have made us realize our duties and obligations and the necessity of availing ourselves of every possible opportunity. To this end the program of the Tulane Student Chapter has been dedicated.

Rhode Island State College

"During the past school year the Student Chapter carried out an active schedule of events which held the interest of the members. Because we felt that this year might be the last normal period of Student Chapter activity, with the advent of the three-semester accelerated program, it was the aim of the officers in planning and carrying out the schedule to make this the most successful year in the history of the Student Chapter at Rhode Island State College.

"In the fall of 1938 our Chapter was instrumental in the successful inauguration of the Engineering Council, the body which coordinates the activities of all the student chapters at the college, and it has fostered other activities for the good of the college. This year, in addition to the customary meetings and field trips, it has been the aim of the college to carry out a series of activities that would be of interest and service to the entire college, and to publicize the accomplishments of the Society. Our activities have ranged from the handling of all arrangements for an assembly for the entire student body of twelve hundred to sponsoring a series of non-technical educational meetings....

"Included in the list of suggestions for Student Chapter management sent to us last fall was one advising long-range planning of activities. We have found that in situations calling for the sharing of lecture rooms and projection facilities, long-range planning gives us the advantage of first call on these facilities. The possibility of scheduling outstanding speakers, even from distant places, in connection with business trips that they may be making, is another important advantage of planning ahead."

Yale University

"The framework of the program of the Yale University Chapter has been our meetings, at which talks by well-known engineers are featured. This year we have held several joint meetings with the electrical and mechanical engineering student groups, subjects of interest to all three branches being discussed. The principal speakers for our own Chapter have been Professors Hardy Cross and C. W. Dunham, both of Yale, and Arthur V. Sheridan, of the New York City Planning Commission."

VIRGINIA MILITARY INSTITUTE

The Virginia Military Institute Chapter has just completed its twenty-first year. In many ways the past nine months have differed radically from any others in our Chapter's history. Members of the faculty have been called to active duty. Graduation was moved up a whole month. Proposed inspection trips have been canceled. Attendance at Society meetings was restricted to second and third classmen because the accelerated schedule for the first class made furloughs prohibitive. All during the year the aims and purposes of the Society have unobtrusively impressed themselves upon the cadets. We were lucky in being able to have James E. Jagger, new Field Secretary of the Society, visit us and talk about the Society. Of the 135 graduates, 133 (all who were physically qualified) received their commissions as second lieutenants and twenty-four hours later reported for active duty.

GRADUATION SCENE AT VIRGINIA MILITARY INSTITUTE
The Sword and Plumed Shako of the Cadet Officer Are Exchanged for the Gold Bars of the Second Lieutenant

UNIVERSITY OF SOUTH CAROLINA

Although there are many reasons why an engineering society can function year after year, there are usually two that hold it together. They are regular meetings where students traveling the same road may get together and express their ideas and acquire confidence in themselves, and the social contacts and fellowship inspired by group activities. We feel that the University of South Carolina Chapter tends to bind the civil engineering students together into a more compact unit than would otherwise be possible. The very nature of our work tends to set us apart from the rest of the university, and for that reason our Chapter meetings are doubly important.

UNIVERSITY OF VERMONT

The engineering college at the University of Vermont is now undergoing an era of expansion. During the year, our quarters have been changed from the old engineering building to the new Waterman building. The faculty and students have been spending most of their spare time planning and designing to set up within the basement of this building some of the most modern and up-to-date laboratories. Most of this work is now complete so that coming students will be enjoying the results. All of this experience has been most beneficial to the members of the Chapter in that they have received a large amount of practical experience in the laying out of laboratories.

STUDENT CHAPTER GROUP AT WEST VIRGINIA UNIVERSITY

WEST VIRGINIA UNIVERSITY

"That the members of the West Virginia University Chapter have shown a definite interest in the Society this year, I believe, is reflected in the report they are submitting. Much of its preparation necessarily fell upon the officers, particularly the president and secretary, who put a great deal of time and effort into it.

"One part of our program with which I am not entirely satisfied is the presentation of student papers, and I would appreciate any recommendations the Society may have to offer. . . . An outstanding event of the year's program was the visit of James E. Jagger, Field Secretary. He gave the men an insight into the Society and its relations to the profession which I believe greatly increased their interest in the Society."

UNIVERSITY OF VIRGINIA

"I would describe this as only a moderately successful year for the University of Virginia Chapter. We are just coming out of the doldrums of having a very small membership. The sophomore, junior, and senior classes in civil engineering were very small, and since the brunt of the work and organization of the Chapter fell on them it was hard to accomplish much. The first-year class in civil engineering was larger than for the past four or five years. It was a very enthusiastic and active group and has learned the ropes. This, coupled with the tendency toward increased enrolment in civil engineering, leads me to believe that we shall have a large and active Chapter here next year and in years to come."

Recognition of Student Chapter Accomplishments, 1941-1942

YEARLY, since 1935, the Committee on Student Chapters has recommended, for the approval of the Board of Direction of the Society, twelve Student Chapters to receive the President's letter of commendation for their record of outstanding activities and accomplishments during the preceding school year. The Board of Direction has confirmed the Committee's recommendations for the year 1941–1942, and as a result the President's letter of commendation is being sent to the following Chapters:

LOCATION OF CHAPTER	DATE OF ESTABLISHMENT	NUMBER OF TIMES COMMENDED
University of Colorado	1920	1st time
University of West Virginia . . .	1921	1st time
University of Kansas	1921	2nd time
College of the City of New York .	1923	2nd time
Rhode Island State College . . .	1932	2nd time
Iowa State College	1920	3rd time
Newark College of Engineering . .	1931	4th time
Carnegie Institute of Technology .	1922	5th time
Stanford University	1920	5th time
University of Illinois	1921	7th time
Virginia Military Institute	1921	7th time
Tulane University	1933	8th time

Daniel W. Mead Student Prize

ANNOUNCEMENT has been made of the award of the Daniel W. Mead Student Prize for the year 1941–1942 to Alfred C. Ingersoll, of Buffalo, N.Y., for his paper on "Ethical Standards and How Best They Can Be Developed." Mr. Ingersoll is a recent graduate of the University of Wisconsin and a past-president of the Student Chapter there.

The award, consisting of $25 in cash and a certificate, will be presented to Mr. Ingersoll on January 20 at the time of the Annual Meeting in New York.

ITEMS OF INTEREST

About Engineers and Engineering

Civil Engineering for January

A plan for restoring sewers to service in the event of possible air-raid damage has been introduced in the City of Chicago's Bureau of Sewers. The personnel of the Bureau has had special training in emergency repair work. The rapid assembly of the repair crew is also described in the article planned for the January issue, by Thomas D. Garry, Superintendent of Sewers, and A. J. Schafmayer, Assistant Chief Engineer of Sewers, Chicago, Ill.

Basic training of Engineer officers and soldiers covers, in a short intensive course, a wealth of practical construction information. Greatly expanded use of mechanical equipment and the high speed of military operations require that every man be trained to act on his own initiative. Fort Belvoir's commanding officer, Brig. Gen. E. H. Marks, also explains that every Engineer soldier must know how to fight.

The plan of an ordnance depot is determined by the necessary separation of the magazines. The construction schedule of a southern depot, speeded by efficient materials handling, will be recounted by A. C. Polk in the January issue. Of special interest is the engineer-contractor administration for the project.

In order to evaluate the relative reliability of current methods of measuring pore-water pressure in silt and clay, Karl Terzaghi has tested several in the field. The results of this work are given in his article planned for the forthcoming issue. In it he also describes a newly developed elastic-wire strain meter which he considers more accurate than the other methods discussed.

N. G. Neare's Column

Conducted by

R. Robinson Rowe, M. Am. Soc. C.E.

"The October problems in literal arithmetic proved that we engineers have mastered the arts of higher mathematics while neglecting the simpler art of addition. Nearly all papers had correct answers to the tasks in multiplication, division, and involution, viz.:

TENLIS	142857
UP	63
ENLIST	428571
LISTEN	857142
LOOOOOT	8999991
CIVIL)ENGINEER(CO	28583)69089667(24
VRAEE	57166
AANCLE	119236
MAN^3 = BRAVEMAN	249^3 = 15,438,249

"Each of these had a rational solution, altho the last yields more quickly to a table of cubes. The addition problem BONDS + SCRAP = ARMOR also submits to rigid analysis. Since ARMOR is to be a maximum, consider ARMOR $\equiv$ 98768; inspection shows that M $\equiv$ 7, reducing the initial hypothesis to ARMOR $\equiv$ 98??8. Then the problem becomes rational, leading to 30516 + 67892 = 98408. Only three contributors reached this conclusion.

"My own sense of proportion failed me when I proposed the fourth problem, YR:US = DHI:LCA, as I neglected to test for multiple solutions. I had in mind that 24:60 = 318:795, making the key word HYDRAULICS, and expected some to solve it as an anagram. Contributors sent 42 solutions, all different from mine. Eliminating duplicates and inversions, I have a list of 35 distinct solutions, which I am sending to these contributors."

"Maybe there are lots more," suggested Cal Klater, "Fixing a limit to the possibilities might make a good problem."

"Then it's your problem. Since there was more than one answer, I'm trying to forget it and live it down."

"I'd like," commented Isidore Knobbe, "to sum it all up in this way:

ALL
US
NUTS
CRAZY"

"That looks like a good final examination for the class in literal arithmetic," replied the Professor. "For our new assignment, I'm going to leave you to the mercy of Guest Professor Prior. The floor is yours, John."

"Thanks, Noah. As Stein would say, mine is the problem of a box in a box in a box. To save space in the Pacific convoys supplying our troops, efficiency engineers have devised a unique ham-and-egg crate consisting of 3 rectangular boxes *A*, *B*, and *C*. Box *B* just sets diagonally in Box *A*. Box *C* containing the eggs just sets diagonally in Box *B*, leaving triangular spaces for the hams and bacons. Thus no part of Box *C* is in contact with the outer Box *A*, insuring against breakage of eggs in transit.

"On the return voyage, Boxes *B* and *C* are placed side by side within and filling Box *A*, thus serving admirably for the shipment of grapefruit from Florida Island. The dimensions of these boxes are naval secrets. If Box *A* were 5 ft long and box walls were negligibly thin, how wide is the egg box?"

[*All five October problems were solved by Isidore Knobbe (Joseph S. Lambie), O'Kay (Otto Koch) and Richard Jenney. The following answered four correctly: Ann Othernut (J. Charles Rathbun), Walter Steinbruch, and Count Harvey. Our Guest Professor is John C. Prior.*]

Insignia of U.S. Military Forces

About 3,000 members of the Society are now in uniform, as was shown by the survey conducted recently. This would indicate that the amount of business done by military bureaus is constantly increasing. Many civilians will therefore sooner or later find themselves in the company of military men, and it will be a prime necessity to be able to tell quickly their rank and branch of the service from the insignia worn.

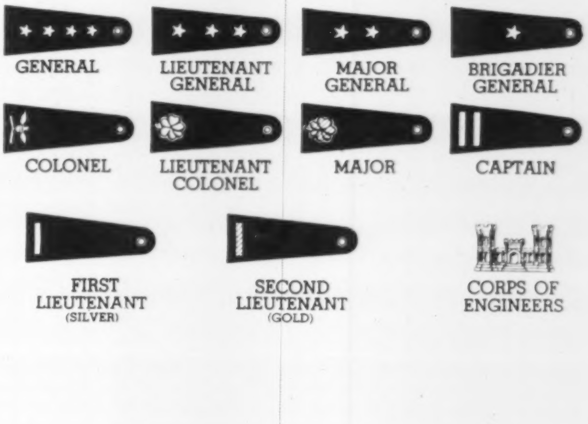
A wide variety of uniforms in the Army and Marine Corps has been made necessary by the many requirements of climatic conditions and branches of service, and insignia are located at the most practical spot on each uniform. For habitual wear all officers wear a service coat of olive-drab wool or cotton. On the lapels, the letters "U.S." will be worn horizontally $^1/_2$ in. above the horizontal line of the lapel. An insignia indicating the arm, service, or the insignia with a prescribed addition, will be worn $^1/_2$ in. below the horizontal line of the lapel, centered below the "U.S."

On each shoulder loop of the service coat, the long overcoat, the short overcoat, raincoat, field jacket, shirt when worn without coat, and on each shoulder of work clothing, metal insignia indicating grade will be worn. Distinctive insignia indicating regiments, battalions, or companies are worn by officers, centered on the shoulder loops above the rank insignia.

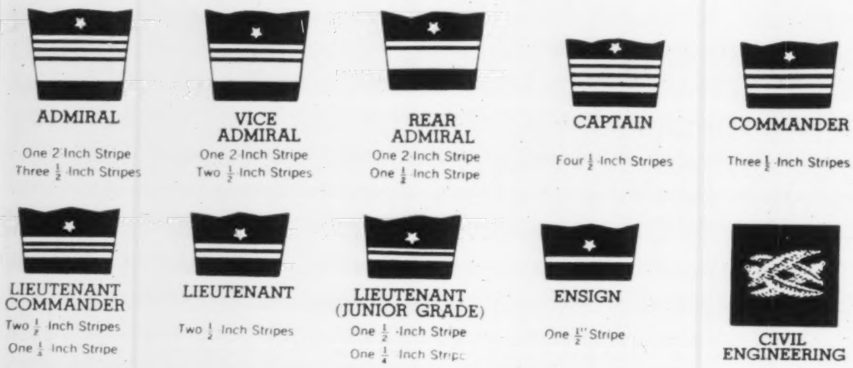
Decorations and service medals are worn on the left breast about 4 in. below the shoulder in one or more lines. Badges (aviation and parachutist) are also worn on the left breast above the line of medals. Other badges for service or special recognition are worn below the line of medals.

When the olive-drab or khaki shirt is worn without the service coat, insignia will be worn on the collar. On the right side the insignia of grade, and on the left side the arm, service, or bureau will be

ARMY RANK INSIGNIA



NAVY RANK INSIGNIA


ADMIRAL
One 2 Inch Stripe
Three $\frac{1}{2}$-Inch Stripes
VICE ADMIRAL
One 2 Inch Stripe
Two $\frac{1}{2}$-Inch Stripes
REAR ADMIRAL
One 2 Inch Stripe
One $\frac{1}{2}$-Inch Stripe
CAPTAIN
Four $\frac{1}{2}$-Inch Stripes
COMMANDER
Three $\frac{1}{2}$-Inch Stripes
LIEUTENANT COMMANDER
Two $\frac{1}{2}$-Inch Stripes
One $\frac{1}{4}$-Inch Stripe
LIEUTENANT
Two $\frac{1}{2}$-Inch Stripes
LIEUTENANT (JUNIOR GRADE)
One $\frac{1}{2}$-Inch Stripe
One $\frac{1}{4}$-Inch Stripe
ENSIGN
One $\frac{1}{2}$" Stripe
CIVIL ENGINEERING

shown. General officers are authorized to wear miniature insignia of grade on the collar. Distinctive insignia worn on service hat, service cap, or garrison cap is similar to that just mentioned in that it indicates regiments or other service organizations. On the garrison cap rank is also shown upon the left side. Officers in the Corps of Engineers have a distinctive button; this is the only component of the Army to have its own button.

The rank of a naval officer is indicated by sleeve stripes on the all-blue uniform. On the all-white uniform, on khaki coats, and on overcoats, rank is shown by bars of lace corresponding to the sleeve stripes worn on shoulder marks of blue. For flag officers, the shoulder marks are covered with gold lace. On this is embroidered a silver foul anchor, and the rank is then shown by five-pointed silver stars, one for commodore, two for rear admiral, three for vice-admiral, and four for admiral. On khaki shirts, rank devices are the same as for the equivalent rank in the Army and Marine Corps, and are worn on the collar.

Above the sleeve stripes on the blue uniform and on the blue shoulder marks are worn the corps devices. On the khaki shirts these are worn on the left side of the collar except in the case of the line officer, when it is not displayed.

Uniform raincoat in blue is worn without Corps marking or rank, but overcoat sleeves have the rank indicated in stripes of black mohair braid—with no line or staff device. The Coast Guard, which is merged with the Navy in time of war, has marks identical with the Navy, except that its men display the distinguishing gold shield in lieu of the Navy's gold star or staff corps devices.

There is a parity of ranks among the commissioned personnel of the Army, Navy, and Marine Corps as follows:

ARMY AND MARINE CORPS	NAVY
Second Lieutenant	Ensign
First Lieutenant	Lieutenant, junior grade
Captain	Lieutenant
Major	Lieutenant Commander
Lieutenant Colonel	Commander
Colonel	Captain
Brigadier General	Commodore
Major General	Rear Admiral
Lieutenant General	Vice Admiral
General	Admiral

Engineers will be interested especially in the insignia reproduced here, for these are the branches of service with which they are most likely to be associated. No rank below commissioned officer is shown, and the many insignia indicating army corps, division, and regiment are omitted. The fullest cooperation of the Army and Navy has gone into the preparation of this article, and special permission has been received from the Connecticut Mutual Life Insurance Company to reproduce the insignia shown from their copyrighted folder.

Chinese Institute of Engineers

IT IS over twenty years since the Chinese Institute of Engineers came into being. In 1919, under the name of the Chinese Engineering Society, it was first organized in the United States. Later it was reorganized in China as the Chinese Institute of Engineers (C.I.E.), with an America Section in this country.

At the outbreak of war with Japan, most of the members in America were called back to duty in China, and therefore the America Section has been rather inactive during the last few years. Realizing the importance of reviving such activities, Chinese engineers recently resolved to give the America Section a new start. At a convention in New York in August, officers were elected as follows:

President—L. F. Chen
Vice-Presidents—A. T. Liu and P. H. Chin
Executive Officers—T. C. Hsiung, C. H. T'ang, Assoc. M. Am. Soc. C.E., and C. H. Wang

The four usual groups of engineering are of course represented in the C.I.E., and also the chemical and aeronautical fields. Local chapters are being organized in New York, Washington, D.C., Detroit, Ithaca, Boston, California, and elsewhere. The total number of members is expected soon to reach three or four hundred.

Recently, under the auspices of the Secretary of the Society, the C.I.E. established contacts with the officers of various national engineering bodies, looking toward an exchange of courtesies, the planning of and participation in special lectures, and similar activities. The Institute is also arranging for the publishing of a bi-monthly news bulletin and journal.

All these efforts are aimed toward assisting and giving strength to this newly revived organization of Chinese engineers, the only one of its kind in this country.

Steel Reinforcement Standardized

Two Standards of Steel Reinforcing have recently been announced by the Division of Simplified Practice of the National Bureau of Standards. These cover, respectively, steel reinforcing spirals and steel reinforcing bars.

Recommendations regarding spirals were adopted in 1927, 1930, and 1932. The latter were reaffirmed in 1938 and are now again reaffirmed. The simplified list of four sizes of steel spiral rods, represents a reduction of about 42% in the number of sizes. These four sizes are those permitted by Schedule I of Limitation Order 211, issued by the War Production Board.

Similarly, steel reinforcing bars were first simplified in 1924, when the prevailing number of sizes was reduced from 32 to 11. This number was continued until the advent of the present war, when the industry in collaboration with the War Production Board eliminated the $^1/_2$-in. square bar as a conservation measure. At present, therefore, the selection is limited to ten sizes, as set forth in Schedule I to Limitation Order L-211, Concrete Reinforcement Steel, issued by the War Production Board on October 23, 1942.

Copies of these latest recommendations for spirals and bars may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., at 5 cents each.

Contractors Receive Army-Navy Award

DESIGNATION of the group of eight Pacific Naval Air Base contractors for the Army-Navy "E" award marks the first time that construction organizations have thus been officially recognized. This award is for outstanding performance on the construction of new air and fleet bases on remote islands of the Pacific and for major additions and improvements to naval stations on the island of Oahu, Territory of Hawaii.

The award, heretofore conferred only on industrial plants, now gives the Turner Construction Company, the Hawaiian Dredging Company, Ltd., the Raymond Concrete Pile Company, the Morrison-Knudsen Company, J. H. Pomeroy and Company, the W. A. Bechtel Company, the Utah Construction Company, and the Byrne Organization, the right to display the Army-Navy "E" flag at their Pacific field headquarters.

It also extends to their engineers and other employees the right to wear the "E" lapel pin in recognition of the contribution which each of them has made to the improvement of facilities essential to the winning of the war.

Amendment of Renegotiation Law

Engineers may be interested particularly in one phase of a recent amendment to the Renegotiation Law, as included in the recently enacted tax bill. It will be remembered that the original Renegotiation Law was Section 403 of the Sixth Deficiency Appropriation Measure, enacted in April 1942.

Under Title VIII of the recent revenue law it is provided that: "(2) The Secretary of a Department is authorized, in his discretion, to exempt from some or all of the provisions of this section:

> "(ii) any contracts or subcontracts under which, in the opinion of the Secretary, the profits can be determined with reasonable certainty when the contract price is established, such as certain classes of agreements for personal services, for the purchase of real property, perishable goods, or commodities the minimum price for the sale of which has been fixed by a public regulatory body, of leases and license agreements, and of agreements where the period of performance under such contract or subcontract will not be in excess of thirty days;"

It will be noted that such exemption is discretionary with the Secretary, so that there is no assurance that this will necessarily affect engineering contracts. But for those engineers who have had agreements for personal services, it is something to be remembered.

Meeting of N.C.S.B.E.E. Omitted

It is announced that the annual meeting of the National Council of State Boards of Engineering Examiners will not be held this year, by vote of the Member Boards. All committees will remain intact and the terms of President, Vice-President, Past-President, and two Directors will be automatically extended. This decision was made chiefly to curtail travel, as advised by the Government, and because many Board members are so occupied with war activities that it might be difficult to get a quorum.

NEWS OF ENGINEERS

Personal Items About Society Members

Leslie G. Holleran has completed his work as chief engineer of Todd and Brown, Inc., on the supervision of design and construction of the Kingsbury Ordnance Plant at La Porte, Ind., and has become associated with Gilmore D. Clarke and Michael Rapuano, consulting engineers with offices at 10 Rockefeller Plaza, New York City.

Elmer E. Moots, formerly professor of mathematics and engineering at Cornell College (Mount Vernon, Iowa), has been appointed associate director of research on sound control at Cruft Laboratory, Harvard University. Professor Moots will be in charge of personnel and technology.

H. G. Gerdes, lieutenant colonel, Corps of Engineers, U.S. Army, has been transferred from construction of the Wellston Air Depot at Robins Field, Macon, Ga., to Atlanta, Ga., where he will assume charge of the construction of the Marietta Aircraft Assembly Plant.

Norman W. Kelch has resigned as engineer-manager for the Clay Products Association of the Southwest in order to become superintendent of building and maintenance for Basic Magnesium, Inc., near Las Vegas, Nev. He will be succeeded by **Jo B. Jones**, formerly state field engineer for the WPA. Mr. Jones' headquarters are in Austin, Tex.

I. L. "Larry" Johnson is now lieutenant commander in the Civil Engineer Corps of the U.S. Navy, stationed at Pearl Harbor, Hawaii, as officer-in-charge of the Public Works Design Section of the 14th Naval District. He was recently promoted from the rank of lieutenant.

William Monroe White has retired as manager and chief engineer of the hydraulic department of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., after thirty-one years of service with the organization.

Armando Santacruz, Jr., has been appointed chief of the Flood Control Division of the Federal Department of Communications and Public Works of the Mexican Government. Until lately he was chief of the Bureau of Public Buildings.

A. M. Martin, who is in the U.S. Engineer Office at Galveston, Tex., has been promoted from the grade of junior engineer (architectural) to that of assistant engineer (civil).

Frank T. Miller, consulting engineer of Greensboro, N.C., has accepted a position as chief engineer of the Grannis, Higgins, Thompson, and McDevitt Company, contractors on the construction of the Air Force Technical School at Goldsboro, N.C.

John D. Watson is now on leave from his duties as assistant professor of civil engineering at Duke University, in order to take charge of airport construction in the vicinity of Grenada, Miss.

Bruce B. Cloud, formerly engineer for the H. B. Zachry Company, of Laredo, Tex., has been commissioned a lieutenant in the Corps of Engineers, U.S. Army, and is now serving as instructor at the Officer Candidate School at Fort Belvoir, Va.

Frank M. Smith, Jr., professor of civil engineering at North Texas Agricultural College, was called into the Army in August, with the rank of captain. At present he is stationed at Longview, Tex., where he is post engineer at the Harmon General Hospital.

Harry C. Vensano has been appointed public works director of San Francisco, succeeding the late **Alvin D. Wilder**. Mr. Vensano was director of works for the 1940 Golden Gate International Exposition.

William C. Olsen, Raleigh (N.C.) consultant, has been retained as resident and supervising engineer on the construction of a municipal water supply for the city of Wilmington, N.C. The project is being built at King's Bluff.

Byron E. Doll has been promoted from the rank of first lieutenant in the Corps of Engineers, U.S. Army, to that of captain, and assigned as area engineer for Camp White, Ore.

Ralph C. Stribling, resident engineer for the Gulf Oil Corporation at Buras, La., has been transferred to the company's Houston (Tex.) office.

Paul Weir, for the past eleven years superintendent of filtration and chief chemist for the city of Atlanta, Ga., has been appointed assistant general manager of the city's water department. Mr. Weir is the first engineer in the history of the department to hold this position.

Leslie J. Reardon, until lately an engineer on the construction of army air bases in Trinidad, has been appointed assistant professor of mechanics at the Case School of Applied Science.

Harold R. Reynolds, Jr., is now an ensign in the Civil Engineering Corps of the U. S. Navy, stationed at Norfolk, Va. He was formerly structural draftsman and designer for Frederic R. Harris, Inc., of New York City.

William F. Babcock was recently promoted from the position of instructor in civil engineering at North Carolina State College to that of assistant professor.

Dean Gray Edwards has been appointed chief borough engineer for the Borough of Manhattan. He was previously consulting engineer for the borough.

L. B. Barker, **Alexander Brest**, and **C. W. Haupt** have been commissioned majors in the Corps of Engineers, U.S. Army. Before being called to active duty, Major Barker was construction engineer for the Sanitary District of Chicago; Major Brest, secretary and treasurer for the Duval Engineering and Contracting Company at Jacksonville, Fla.; and Major Haupt, vice-president of the Strobel Construction Company, Chicago, Ill.

Henry L. Howe, city engineer of Rochester, N.Y., has been elected president of the American Public Works Association.

Donald H. McCoskey has been commissioned a major in the Corps of Engineers, U.S. Army. Until recently he was principal engineer in the U.S. Engineer Office at Kansas City, Mo.

Z. E. Sevison has resigned as state highway engineer of North Dakota in order to resume his consulting practice at Casper, Wyo. During his five years as state highway engineer Mr. Sevison was responsible for the rebuilding of much of the state's road system, including hard surfacing of all main routes.

DECEASED

Carolus Morton Broomall (M. '31) borough engineer of Swarthmore (Pa.), died at his home at Media, Pa., on November 1, 1942. Mr. Broomall, who was 72, had been a member of the Delaware County bar since 1891 but was more active as a civil engineer. He taught civil engineering at Drexel Institute for twelve years and was borough surveyor for Media from 1895 to 1920. He was then borough engineer, successively, for Media and Swarthmore and, at the same time, maintained a private practice in civil and chemical engineering.

George Washington Craig (Assoc. M. '06) consulting engineer of Evanston, Ill., died at his home there on November 4, 1942, at the age of 72. Mr. Craig had been city engineer of Calgary, Alberta (Canada), and from 1936 to 1939 was commissioner of public works and city engineer of Evanston, Ill. At one time he maintained an engineering and contracting practice in Omaha, Nebr., and for some years was president of the Chicago firm, Craig, Skidmore and O'Brien, Inc.

John Henry Darling (M. '01) died at his home in Duluth, Minn., on September 12, 1942. Entering the employ of the government in 1873, Mr. Darling was engaged for nine years as assistant engineer for the U.S. Lake Survey, and in 1883 was employed on river improvements at St. Paul. From 1884 to 1913, when he retired, he was principal assistant engineer on government harbor improvement projects on Lake Superior. Mr. Darling was one of the oldest alumni of the University of Michigan, having graduated in 1873.

Marius Schoonmaker Darrow (Assoc. M. '08) manager of the Barber Asphalt Corporation, Madison, Ill., died during the past year, though the Society has just heard of his death. Mr. Darrow, who was about 65, had been with the Barber Asphalt Company since 1911—until 1916 as superintendent and from then on as manager. Earlier in his career he was with the Chicago and Northwestern Railway, the Baltimore and Ohio, and the Great Northern and, at one time, was hydraulic engineer for the J. G. White Engineering Corporation at Richfield, Idaho.

William Worrell Drummond (M. '17) associate civil engineer and superintendent of construction in the U.S. Engineer Office at Newport, R.I., died on October 3, 1942. He was about 68. Mr. Drummond had been with the War Department since 1909, having been engaged on construction projects at Fort Oglethorpe, Fort Moultrie, Camp Devens, and various other posts. From 1912 to 1915 he was in the Philippines, where he was employed on the design and construction of a reservoir and water system for Corregidor.

John Edwin Greiner (M. '90; Hon. M. '32) consulting engineer of Baltimore, Md., died on November 11, 1942. Mr. Greiner served as Director of the Society from 1915 to 1917, and was elected an Honorary Member in 1932. A brief biography and sketch appear elsewhere in this issue.

Jay Russell Hickox (M. '39) was fatally stricken in his office in the Chicago, Burlington and Quincy building in Chicago on November 2, 1942. Mr. Hickox, who was 77, was in private engineering practice from 1891 to 1906. From the latter year on he was with the Chicago, Burlington and Quincy lines, serving successively as transitman, engineer of maintenance of way, principal assistant engineer, and hydraulic engineer. Since 1935 he had served the railroad in a consulting capacity.

John Hedberg (Assoc. M. '38) associate professor of civil engineering at Stanford University, Palo Alto, Calif., died on August 3, 1942, at the age of 35. Dr. Hedberg was the Society's Freeman Traveling Scholar in 1936 and 1937, and from the latter year on was a member of the civil engineering staff at Stanford. Earlier in his career he was a research assistant and instructor at Purdue University and junior engineer in the Denver (Colo.) office of the U.S. Bureau of Reclamation.

John James Hurley (M. '25) engineer for the Dillaby Fireproofing Company, of Cambridge, Mass., died on June 25, 1942. He was 53. Mr. Hurley was an authority on masonry materials and, at the time of his death, was chairman of the Planning Board of the City of Somerville, Mass. For a number of years (1925 to 1937) he was chief engineer of the Rockland-Rockport Company at Rockland, Me.

William Frederick Jenrick (Assoc. M. '13) of the Stone and Webster Engineering Corporation, died on October 24, 1942. Mr. Jenrick, who was 56, had been with Stone and Webster since 1915 as chief estimator in the construction department. Earlier in his career (1910 to 1913) he was with the Foundation Company. For a number of years he was a special lecturer on estimating at the Massachusetts Institute of Technology.

Julius Kahn (M. '17) retired engineer of Cleveland, Ohio, died on November 4, 1942, at the age of 68. A native of Germany, Mr. Kahn was educated in the United States and spent his career here. He was with the Union Bridge Company, of Athens, Pa., and the C. W. Hunt Company, of New York. From 1900 to 1903 he was associate architect with his brother, Albert Kahn, in Detroit. In the latter year he became president and general manager of the Truscon Steel Company, remaining in that capacity until the company became a part of the Republic Steel Corporation in 1935. After the merger he served as vice-president of Republic Steel, resigning in 1939.

Paul Alois Kirchner (Assoc. M. '05) consulting engineer of Philadelphia, Pa., died on September 26, 1942. He was 69. From 1894 to 1899 Mr. Kirchner was with the Pencoyd Iron Works, and from 1899 to 1905 assistant engineer for the Chesapeake and Ohio Railway Company. Before establishing his consulting practice in Philadelphia he was consulting bridge engineer for the Richmond, Fredericksburg and Potomac Railroad.

Joseph Barlow Lippincott (Hon. M. '36) well-known Los Angeles consultant, died suddenly on November 4, 1942. Mr. Lippincott, who was 78, had been a Member of the Society since 1899 and an Honorary Member since 1936. A more detailed sketch and photograph appear elsewhere in this issue.

Oro McDermith (M. '20) died at the National Military Home in Los Angeles, Calif., on September 10, 1942, at the age of 62. From 1903 to 1917 Mr. McDermith was with the U.S. Reclamation Service (U.S. Bureau of Reclamation). He then served as a captain with the 104th Engineers in the A.E.F. Upon his return to this country, he was consulting engineer for several irrigation districts. Later (1925 to 1928) he was president of the Derbon Construction Company and special engineer for United Engineers and Constructors, of Philadelphia, Pa.

Charles Prosper Eugene Schneider (Hon. M. '21) leading French maker of arms, died in Paris on November 17, 1942. Mr. Schneider, who was 74, was elected an Honorary Member of the Society in 1921. An obituary will be found in "Society Affairs."

Roland Robert Small (Assoc. M. '40) is a recent casualty of the U.S. Army. He was 29. A graduate of the College of the City of New York in 1934, Mr. Small had been assistant engineer on the construction of the Henry Hudson Parkway for the New York City Department of Parks and superintendent of construction for the Farub Foundation Corporation, of New York. His most recent assignment was that of engineer and estimator for the P. T. Cox Construction Company in New York.

Frank Herbert Snow (M. '04) secretary of the Pennsylvania Water Works Association, died at his home in Harrisburg, Pa., on October 28, 1942, at the age of 76. At the outset of his career Mr. Snow was city engineer for Brocton, Mass. He became head of the sanitary division of the Pennsylvania State Health Department when it was created in 1906 and, later, was chief engineer of the Pennsylvania Public Service Commission. At one time, also, he maintained a consulting practice in Harrisburg.

Edward Gilbert Williams (M. '97) who retired last year as vice-president and treasurer of the J. G. White Engineering Corporation, New York City, died at his home in Brooklyn on October 22, 1942. Mr. Williams, who was 77, had been with J. G. White since 1909. Earlier in his career he had been general manager of the Caribbean Manganese Company and chief engineer, successively, for the Continental Jewell Filtration Company and the Long Island Motor Parkway.

Changes in Membership Grades

Additions, Transfers, Reinstatements, and Resignations

From October 10 to November 9, 1942, Inclusive

ADDITIONS TO MEMBERSHIP

Anderson, Charles Adolph Rosell (Jun. '42), Junior Constr. Engr., Turner Constr. Co., Box 432, Southington (Res., 81 Wyoming St., Stratford), Conn.

Armiger, Oliver Leroy (Assoc. M. '42), Pres., Armiger Constr. Corp., 2127 Maryland Ave., Baltimore, Md.

Atkins, Clinton Paul (Jun. '42), Structural Crane Designer, Dravo Corp., Neville Island (Res., 3010 Delwood Ave.), Pittsburgh (16), Pa.

Atkinson, Thomas George (Jun. '42), Draftsman-Computer, Leeds, Hill, Barnard & Jewett, 1000 Edison Bldg., Los Angeles (Res., 1136 East Mendocino St., Altadena), Calif.

Bacon, Henry Ferdinand (Jun. '42), Draftsman, Curtiss-Wright Corp., Genessee St., Buffalo (Res., 241 Oak Grove Drive, Williamsville), N.Y.

Barnes, Jack Yale (Assoc. M. '42), Field Engr., Portland Cement Assn., 1317 West 2d St., Clear Lake, Iowa.

Barry, Benjamin Austin, Brother, F.S.C. (Jun. '42), Instr., Science Dept., St. Peters School, 64 St. Mark's Pl., New Brighton, S.I., N.Y.

Barton, Roland Neal (Jun. '42), Ensign, CEC, U.S.N., 2973 Essex Rd., Cleveland Heights, Ohio.

Bassar, Nicholas, Jr. (Jun. '42), Draftsman, Chicago Bridge & Iron Co., 1305 West 105th St. (Res., 5310 South Sawyer Ave.), Chicago, Ill.

Bell, James Tommie, Jr. (Jun. '42), Lt., Corps of Engrs., U.S. Army, 113 West Duval St., Live Oak, Fla.

Bennett, Philip Frank (Jun. '42), Junior Draftsman, Inspection Dept., Humble Oil & Refining Co. (Res., 105 Illinois), Baytown, Tex.

Bertle, Frederick Albert (Jun. '42), Junior Civ. Engr., TVA, Gilbertsville, Ky.

Blouin, Paul Emil (Assoc. M. '42), Asst. Dist. Engr., The Lane Constr. Corp., 37 Colony St. (Res. 41 Murray St.), Meriden, Conn.

Bond, Cyrus Huntington, Jr. (Jun. '42), Junior Engr., The M. W. Kellogg Co. (Res., 227 Fifth Ave., North), Texas City, Tex.

Boyle, Frank William (Jun. '42), Stress Analyst, Curtiss-Wright Corp., Lambert Field, Robertson, Mo.

Brendler, Arthur William (Jun. '42), Aviation Cadet, Air Corps, U.S. Army, 1032 South Orange Ave., Newark, N.J.

Brewer, William Walter, Jr. (Jun. '42), Civ. Engr., Dames & Moore, 1504 Russ Bldg., San Francisco, Calif.

Brockenbrough, Thomas William (Jun. '42), Junior Stress Analyst, The Glenn L. Martin Co. (Res., 2502 Allendale Rd.), Baltimore, Md.

Brocker, Robert John (Assoc. M. '42), Archt. and Engr., 201 Coulter Bldg., Greensburg, Pa.

Brown, Roger Allan (Jun. '42), Junior Civ. Engr., TVA, Ocoee No. 3, Dam, Ducktown, Tenn.

Brown, Walter Albert, Jr. (Jun. '42), Structural Draftsman, Am. Bridge Co. (Res., 607 Maplewood Ave.), Ambridge, Pa.

Brubaker, Joseph Junior (Jun. '42), Asst. Engr., Utah Fuel Co., Castle Gate, Utah.

Bulfinch, Francis Vaughan (M. '42), (Coolidge, Shepley, Bulfinch & Abbott), 1 Court St., Boston, Mass.

Carter, Oliver Martin, Jr. (Jun. '42), 2d Lt., 601st Engr., Camouflage Battalion, U.S. Army, Box 217, Bagdad, Fla.

Chernoff, Max (Jun. '42), Structural Draftsman, Solvay Process Co., Hopewell, Va.

Comer, Alton Byrd (Jun. '42), Structural Detailer, Am. Bridge Co. (Res., 231 Chase St.), Gary, Ind.

Covarrubias, Javier, Jr. (Jun. '42), With Alimentos Frescos Congelados, S.A., Nardo y Maranjo (Res., Ave. Oaxaga 81), Mexico, D.F., Mexico.

Crowe, Stanley Reed (Jun. '42), Ensign, U.S.N.R., 1022 Sunset, Amarillo, Tex.

Culp, Frank Edward (Assoc. M. '42), Bridge Designing Engr., State Dept. of Highways, Transportation Bldg. (Res., 1115 West 5th St.), Olympia, Wash.

Curtis, Donald (Assoc. M. '42), Asst. Engr., U.S. Engr. Dept., Wright Bldg. (Res., 708 North Elwood), Tulsa, Okla.

Cutting, Richard Hawley (M. '42), Architectural Engr., Garfield, Harris, Robinson & Schafer, 915 National City Bank Bldg., Cleveland (Res., 3795 Glenwood Rd., Cleveland Heights), Ohio.

Dolan, Leonard Zadok (M. '42), Asst. Works Mgr., Fraser-Brace Eng. Co., Inc., Holston Ordnance Works, Kingsport, Tenn.

Donovan, Richard Julian (Jun. '42), Asst. Civ. Engr., U.S. Engr. Office, Cooperstown, N.Y.

Duclos, Francis George (Jun. '42), Lt., U.S. Army, 667th Engr. Company (Topographical), Camp Maxey, Tex.

Egeberg, Harold Oscar (Assoc. M. '42), Associate Civ. Engr., U.S. Engr. Dept., Administration Bldg. (Res., 232 Milk River Drive), Fort Peck, Mont.

Eppler, John Frederick (Jun. '42), Instr., Applied Mechanics, Kansas State College, Manhattan, Kans.

Facci, Hugo Angelo (Jun. '42), Asst. Engr., Corps of Engrs., War Dept., 1st and Douglas, N.W. (Res., 1315 Emerson St., N.W.), Washington, D.C.

Feren, John Michael (Jun. '42), Engr.-Designer, Howard, Needles, Tammen & Bergendoff, Camp Function, Fort Riley (Res., 1115 Bluemont, Manhattan), Kans.

Fienup, Kenneth Leroy (Jun. '42), Junior Engr., National Bureau of Standards, Connecticut and Van Ness Sts., N.W. (Res., 3519 Quebec St., N.W.), Washington, D.C.

Fisher, Floyd Seth, Jr. (Jun. '42), Ensign, U.S.N.R., 5820 Palo Pinto St., Dallas, Tex.

Fisher, Gordon Page (Jun. '42), 112 Linden Ave., Hampton, Va.

Fitzmaurice, Robert Melvin (Jun. '42), Junior Engr., Standard Oil Co. of California, Standard Oil Bldg., San Francisco (Res., 698 Walla Vista, Oakland), Calif.

Forston, William Carroll, Jr. (Jun. '42), Junior Structural Engr., TVA, 400 Arnstein Bldg. (Res., 1710½ Highland Ave.), Knoxville, Tenn.

Frank, Robert Gordon (Assoc. M. '42), Engr. (Civ.), U.S. Engr. Office, Camp Carson (Res., 910 East San Miguel St.), Colorado Springs, Colo.

Frederickson, Bernard Vernon (Jun. '42), Junior Engr., Frederickson & Watson Constr. Co., 873 Eighty-first Ave., Oakland, Calif.

Graham, Ralph Elwood (Jun. '42), Junior Engr., Pacific Elec. Ry., 6th and Main Sts., Los Angeles (Res., 620 West Foothill Blvd., Monrovia), Calif.

Freeman, Dean (Jun. '42), Structural Draftsman, Pittsburgh, Des Moines Steel Co., Neville Island, Pittsburgh (Res., 668 Orchard Ave., Bellevue), Pa.

George, Arthur Wayne (Jun. '42), Ensign, U.S.N.R., 7 Gloucester St., Boston, Mass.

George, Leo Lanfall (Jun. '42), With Boeing Aircraft Co. (Res., 5030 Sixteenth Ave., N.E.), Seattle, Wash.

Glenbot, Eugene (Jun. '42), Eng. Asst., Stress Analysis Lockheed Aircraft Corp., Burbank (Res., 1123 North Evergreen Ave., Los Angeles), Calif.

Goodman, David (Jun. '42), Draftsman, Giffels & Vallet, Inc., 800 Marquette Bldg. (Res., 1520 Taylor), Detroit, Mich.

Grasso, Anthony Joseph (Jun. '42), Draftsman, Chemical Constr. Corp., 1250 Sixth Ave., New York (Res., 2950 West 31st St., Brooklyn), N.Y.

Greenfeld, Albert (Jun. '42), 1st Lt., U.S. Army, Headquarters and Service Company, 132d Engrs., Camp Framingham, Framingham, Mass.

Greimann, Victor Everett (Jun. '42), Lt., U.S. Army, Experiment Engr. Section, Aircraft Laboratory, Wright Field, Dayton, Ohio.

Grover, John Theodore (Jun. '42), Aviation Cadet, Air Corps, U.S. Army, Palmer Rd., Halifax, Mass.

Guran, John Daniel (Jun. '42), 649 Brown St., Akron, Ohio.

Hablett, Harold Wesley (Jun. '42), Constr. Draftsman, Bethlehem Steel Co. (Res., 6 Glenwood Drive), Ambridge, Pa.

Hahn, Frank Joseph (Jun. '42), Field Engr., M. W. Kellogg Constr. Co., 225 Broadway (Res., 4512 Park Ave.), New York, N.Y.

Halford, Marion Lee (Jun. '42), Ensign CEC-V (S), U.S.N.R., Richardson, Tex.

Hall, Melvin Henric Clemet (Jun. '42), Engr., Boeing Aircraft Co., 2d and Union (Res., 110 North 50th), Seattle, Wash.

Hardeman, Thomas Nash (Jun. '42), 2d Lt., U.S. Army, Box 535, Junction, Tex.

Harris, Jerome Dee (Assoc. M. '42), 1st Lt., Corps of Engrs., U.S. Army, 531 East Park Ave., San Antonio, Tex.

Hassilev, Leonid (Assoc. M. '42), Designing Engr., The Foundation Co., 120 Liberty St. (Res., 322 West 72d St.), New York, N.Y.

Heindl, Louis Armistead, Jr. (Jun. '42), 2d Lt., Infantry, U.S. Army, 1114 West Ave., Richmond, Va.

Helmich, John Edward (Jun. '42), 2d Lt., U.S. Army, Dept. of Gunnery, O.C.S., Fort Sill, Okla.

Henderson, John Nelson (Jun. '42), Junior Engr., Standard Oil Co. of California, Standard Ave., Richmond, Calif.

Hibbert, Malcolm Gilchrist (Assoc. M. '42), Associate Engr., U.S. Engr. Dept., U.S. Engr. Office, Galveston, Tex.

Hinson, Francis Marion, Jr. (Jun. '42), Bennettsville, S.C.

Hoeft, John (Jun. '42), Eng. Draftsman, Taylor, Taylor & Barnes, 816 West 5th St., Room 407, Los Angeles (Res., 5519 Barton Ave., Hollywood), Calif.

Hogue, Wilbur Owings (Assoc. M. '42), Civ. Engr., Firestone Plantation Co., Akron, Ohio. (Res., 621 South Arthur St., Pocatello, Idaho.)

Huckleberry, Bowen Combs, Jr. (Assoc. M. '42), Capt., Corps of Engrs., U.S. Army, Post Engr., Quarters 16, Fort Brady, Mich.

Hudson, William Otis, II (Jun. '42), Ensign, U.S.N.R., 1915 Peniston St., New Orleans, La.

Humphreys, Guy Howard (M. '42), (Howard Humphreys & Sons), 7 Eldon Sq., Reading, England.

Hutchinson, George Willis (Assoc. M. '42), Box 607, Raleigh, N.C.

Iadavaia, Vincent Anthony (Jun. '42), Field Engr., M. W. Kellogg, Boston and Eaton Sts., Baltimore, Md. (Res., 2886 Morris Park Ave., New York, N.Y.)

TOTAL MEMBERSHIP AS OF NOVEMBER 9, 1942

Members	5,853
Associate Members	7,047
Corporate Members	12,900
Honorary Members	38
Juniors	5,090
Affiliates	71
Fellows	1
Total, Nov. 9, 1942	18,100
(Total, Nov. 9, 1941	17,107)

Ingersoll, Alfred Cajori (Jun. '42), Research Engr., The Linde Air Products Co., Tonawanda (Res., 186 Claremont Ave., Buffalo), N. Y.

Jackson, Hugh Hill, Jr. (Assoc. M. '42), Asst. Engr., Municipal Engr. Div., The Panama Canal, Balboa, Canal Zone.

Jacob, Charles Edward (Assoc. M. '42), Asst. Hydr. Engr., U.S. Geological Survey, 226 Post Office Bldg., Jamaica (Res., 154-19 Sixty-fourth Ave., Flushing), N.Y.

Jeong, George Theung (Jun. '42), Junior Civ. Engr., U.S.N., Mare Island Navy Yard, Vallejo (Res., 1019 Grant Ave., San Francisco), Calif.

Jephcott, Donald Kenneth (Jun. '42), Research Analyst, Douglas Aircraft Co., Inc.; El Segundo (Res., 1245 Colton St., Los Angeles), Calif.

Jeu, Hing (Jun. '42), Junior Naval Archt., Navy Yard, Mare Island (Res., 1046 Powell St., San Francisco), Calif.

Jones, Mortimer Drahn (Jun. '42), Engr., Osage Constr. Co. (Res., 6421 Kenwood), Dallas, Tex.

Kallstrom, Charles Edward (Jun. '42), Eng. Draftsman, Chicago Bridge & Iron Co., 1305 West 105th St. (Res., 1557 West 83d St.), Chicago, Ill.

Katzer, Maurice Eugene (Jun. '42), 1418 North Greenwood, Fort Smith, Ark.

Kellam, Harold St. Clair, Jr. (Jun. '42), Ensign, U.S.N.R., Naval Training School, Mass. Inst. Technology, Cambridge, Mass. (Res., 866 Regal Rd., Berkeley, Calif.)

Kimmelsman, Ben Stuart (Jun. '42), With U.S. Army, 1115 South Ogden Drive, Los Angeles, Calif.

Klurfeld, Samuel (Jun. '42), Junior Civ. Engr., Maps and Surveys, Div., TVA, Chattanooga, Tenn. (Res., 1772 Vyse Ave., New York, N.Y.)

Kollar, Konstantine Louis (Jun. '42), Junior Hydr. Engr., Dept. of Interior, U.S. Geological Survey, Box 558, Hinton, W.Va.

Krucklin, Robert Elmer (Jun. '42), 2d Lt., U.S. Army, 1st Engr. Battalion, Army Post Office 1, Care, Postmaster, New York, N.Y.

Landsman, Jerome Joel (Jun. '42), Junior Naval Archt., U.S. Navy Yard, Philadelphia, Pa. (Res., 3115 Brighton 4th St., Brooklyn, N.Y.)

Lathrop, Robert Penfield (Jun. '42), Constr. Engr. and Insp., U.S.N., Naval Air Base, Cedar Point, Md. (Res., 416 South Garfield St., Arlington, Va.)

Laushey, Louis McNeal (Jun. '42), Care, Dept. Civ. Eng., Carnegie Inst. Technology, Schenley Park, Pittsburgh, Pa.

Lawrance, Charles Holway (Jun. '42), With U.S. Marine Corps Reserve, 99 Summer Ave., Kingston, Mass.

Levanti, Arsenio (Jun. '42), Ciudad Bolivar, Venezuela.

Levine, Bert (Jun. '42), Asst. Civ. Engr., U.S.N., Navy Yard, Charleston, S.C.

Light, Eugene Perry (Assoc. M. '42), Secy. and Treas., Austin Engrs., Inc., 2842 West Grand Blvd., Detroit (Res., 1318 West Hines, Midland), Mich.

Lincer, Maxwell (Jun. '42), Junior Engr (Civ.), U.S. Engrs., Cooperstown, N.Y.

Lind, George William, Jr. (Jun. '42), 529 South Madison Ave., Pasadena, Calif.

Lipson, Ralph (Assoc. M. '42), Asst. Civ. Engr., Topographical Bureau, Office, Borough Pres. of Queens, Borough Hall, Kew Gardens (Res., 1246 Shakespeare Ave., New York), N.Y.

Livesay, Ernest Boyd (Jun. '42), Junior Civ. Engr., TVA, Field Engrs. Office, Fontana Dam, N.C.

Logan, Claude Duvual, Jr. (Jun. '42), (Logan Brothers), 207 North Willow (Res., 4607 Bayshore), Tampa, Fla.

McAdam, Donald Neer (Jun. '42), Ensign, U.S.N., The Toledo Club, Toledo, Ohio

McConnell, Clifford Harvey (Jun. '42), Airport Design Engr. (Structural), Ellerbe & Co., E-1021 First National Bank Bldg., Minneapolis, Minn.

McGonigle, John Leo, Jr. (Jun. '42), Looper, Fabricated Steel Constr., Bethlehem Steel Co., Bethlehem (Res., 522 Tilghman St., Allentown), Pa.

MacLeman, Everett Louis (Jun. '42), Junior Engr., Turner Constr. Co., Southington (Res., 25 Carmel St., Hamden), Conn.

Magruder, Byron Randel (Jun. '42), La Mesa, N.Mex.

Maguire, Frank Gregory, Jr. (Jun. '42), 2d Lt., U.S. Army, 48th Engrs., Camp Gruber, Okla.

Maier, Karl Joseph (Jun. '42), Junior Engr., Steel & Iron Div., Kaiser Co., Inc., Latham Sq. Bldg., Oakland (Res., 2112 Alemany Blvd., San Francisco), Calif.

Malchenson, Martin (Jun. '42), Prin. Marine Draftsman, U.S. Army, Transport Service, 58th St. and 1st Ave., Brooklyn (Res., 1767 Weeks Ave., New York), N.Y.

Marden, Daniel Seavey (Jun. '42), Junior Engr. (Civ.), Corps of Engrs., War Dept., Umatilla Ordnance Depot, Hermiston, Ore.

Maveety, James Ezell (Jun. '42), Junior Civ. Engr., TVA, Fort Loudon Dam, Lenoir City, Tenn.

Meurer, Charles Samuel (Jun. '42), Shop Contact Man, Curtiss-Wright Corp. (Res., 1966 North High), Columbus, Ohio.

Miller, Albert Robert (Jun. '42), Transitman, Pacific Gas & Elec. Co., Narrows Powerhouse, Smartville (Res., 222 West Blithedale, Mill Valley), Calif.

Moburg, Howard Welby (Jun. '42), Structural Draftsman and Designer, Donald R. Warren, 403 Latham Sq. Bldg., Oakland, Calif.

Monroe, Augustus Currie (Jun. '42), Junior Engr., Mississippi River Comm. (Res., Y.M.C.A.), Vicksburg, Miss.

Morey, Arthur Paine (Assoc. M. '42), Asst. Maintenance Engr., Remington Arms Co., Lake City Ordnance Plant, Independence (Res., 5536 Rockhill Rd., Kansas City), Mo.

Muchmore, Clarence Harold (Assoc. M. '42), Asst. Highway Engr., U.S. Public Roads Administration, Box 1209, Fairbanks, Alaska. (Res., 3730 Morenci St., El Paso, Tex.)

Muhlhausen, Edgar Kirton (Jun. '42), Physics Instr., Robert College, Istanbul, Turkey.

Nelson, Melvin Benard (Jun. '42), Surveyman, U.S. Army Engrs., Camp Adair (Res., 300 North 25th St., Corvallis), Ore.

Nevius, Martin Leroy (Jun. '42), Timekeeper, Turner Constr. Co., 420 Lexington Ave., New York, N.Y. (Res., 34 Evergreen Lane, Haddonfield, N.J.)

Noel, Jim Stribling (Jun. '42), Office Engr., Foley Brothers, Inc. and Walbridge, Aldinger Co., Independence, Mo.

Noonan, Hugh Joseph (Jun. '42), Aviation Cadet, Air Corps, U.S. Army, Aviation Cadet Detachment, Barracks T-573, Chanute Field, Ill.

Norris, James Caspar, Jr. (Jun. '42), 2d Lt., U.S.M.C.R., 3508 Byron Ave., Nashville, Tenn.

Opdycke, Alfred Leonard (Jun. '42), R. F. D. 2, Bryan, Ohio

Parker, Joseph Sanders (M. '42), Chf. Design Engr., Wilson, Bell & Watkins, 145 East High St., Lexington, Ky.

Petersen, Mervin Seamons (Jun. '42), Ensign, U.S.N.R., 366 Commonwealth Ave., Suite 10, Boston, Mass.

Poe, William Nelson (Jun. '42), 1st Lt., Corps of Engrs., U.S. Army, 137 Buist Ave., Greenville, S.C.

Porter, Malcolm Marion (Assoc. M. '42), Asst. Dist. Engr., Bridges, State Highway Comm., North Green St. (Res., 713 East Main St.), Crawfordsville, Ind.

Putnam, Howard Edward (Jun. '42), 759 Westfield Ave., Elizabeth, N. J.

Rehm, Leo Frank (Jun. '42), Asst. Engr., Consoer, Townsend & Quinlan, 211 West Wacker Drive, Chicago, Ill. (Res., 608 East Gorham St., Madison, Wis.)

Reid, John Lawrence (Jun. '42), Ensign, CEC, U.S.N.R., Box 168, Fort Morgan, Colo.

Riley, Edward Warwick (Jun. '42), With U.S.N., 8708 South West 21st Ave., Portland, Ore.

Robbers, Joseph Clifford (M. '42), Maj., Corps of Engrs., U.S. Army, 1556 Branston, St. Paul, Minn.

Roberts, William Calvert (M. '42), Cons. Engr., Roberts & Co., Box 1226, Columbia, S.C.

Robinson, Walter Leonard (M. '42), Gen. Mgr. and Engr., W. L. Florence Constr. Co., Powder Springs (Res., 317 West Rugby Ave., College Park), Ga.

Rodriguez, Louis (Jun. '42), 2d Lt., Air Corps, U.S. Army, A.A.F.C.C., Nashville, Tenn.

Roper, Donald Ross (Jun. '42), With Air Corps, U.S. Army, 544 West 3d St., Chico, Calif.

Schaefer, Charles Alvin (Jun. '42), Structural Draftsman, Chain Belt Co., 1600 West Bruce St. (Res., 2011 North 34th St.), Milwaukee, Wis.

Schantz, John Cosler (Jun. '42), Junior Eng Draftsman, Am. Bridge Co., Elmira (Res., 218 Prospect St., Newark), N.Y.

Settergren, Robert George (Jun. '42), Structural Draftsman, Giffels & Vallet, Inc., 1000 Marquette Bldg. (Res., 3044 Blaine, Apt. 31), Detroit, Mich.

Shields, Santos Vincent (Jun. '42), Ensign, U.S.N.R., 4100 Leonidas St., New Orleans, La.

Shulman, Fred (Jun. '42), 1601 Myrtle St., N.W., Washington, D.C.

Shumaker, Willis Leroy (Jun. '42), Stress Analyst, Curtiss-Wright Corp., Robertson (Res., 2237 Brown Rd., Overland), Mo.

Sielke, Alan Leonard (Jun. '42), Engr.-Estimator, James Stewart & Co., Inc., 230 Park Ave. (Res., 19 Stuyvesant St.), New York, N.Y.

Silva, Melvin Francis (Jun. '42), Engr., Kaiser Co., Inc., Richmond (Res., 2526 Dwight Way, Berkeley), Calif.

Simmons, Desmond Leverock (Jun. '42), Junior Engr., Layout Dept., E. I. du Pont de Nemours & Co., Gopher Ordnance Works, Rosemount (Res., 533 Portland St., St. Paul), Minn.

Smallwood, Charles, Jr. (Jun. '42), 401 Maple St., Sault Ste Marie, Mich.

Sofair, Meir Nassim (Jun. '42), Laboratory and Field Engr., Delaware Testing Laboratories, Inc., 212 South State St., Dover, Del.

Sommerville, Thomas (Jun. '42), Ensign, CEC, U.S.N., 12th Naval Constr. Battalion, Company D, Naval Air Station, Kodiak, Alaska (Res., 730 Locust St., Pasadena, Calif.)

Stevenson, George Franklin (Assoc. M. '42), Res. Engr., State Dept. of Highways, Baton Rouge, La.

Stiemke, Robert Edward (Jun. '42), Associate Prof., San. Eng., North Carolina State College, Raleigh, N.C.

Stiers, George Merlin (Assoc. M. '42), Gen. Supt., Amis Constr. Co., 605 Cotton Exchange Bldg., Oklahoma City, Okla.

Sutliff, Richard Dewitt (Jun. '42), Ensign, A-V (S), U.S.N.R., 69 East State St., Gloversville, N.Y.

Swift, Charles Beal, Jr. (Jun. '42), Ensign, U.S.N.R., 6 Belvoir Ave., Taunton, Mass.

Tang, Stephen Jen Yao (Jun. '42), Draftsman and Detailer, Mississippi Val. Structural Steel Co., Twenty-Fifth Ave., Melrose Park, Ill.

Teague, Jesse Ardell (Jun. '42), 2d Lt., Maintenance Battalion, 9th Armored Div., U.S. Army, Bellevue, Tex.

Thaisz, Louis Joseph (Jun. '42), Junior Naval Archt., U.S.N., Supervisor of Shipbuilding, Camden (Res., 106 Knight Ave., Collingswood), N.J.

Thomas, Clarence Merald (Jun. '42), With U.S.N.R., Gwin Ave., McKenzie, Tenn.

Thornton, Herbert Marshall (Jun. '42), 2d Lt., U.S. Army, 701st Tank Battalion, Camp Polk, La.

Tice, Clifford James (Jun. '42), Field Engr., Cont. Div., Dravo Corp., Neville Island, Pittsburgh, Pa.

Tilley, Bernard White (Assoc. M. '42), Asst. Highway Engr., Dist. 4, State Highway Dept., Mount Hawley Rd., Peoria (Res., 215 Roth St., Morton), Ill.

Tobias, Francis Burl (Jun. '42), Junior Civ. Engr., Kaiser Co., Inc., Latham Sq. Bldg., Oakland (Res., 2527 Dwight Way, Berkeley), Calif.

Toy, Alfred Moy (Jun. '42), Care, U.S. Army, Company K, 2d Engr. School Regiment, Fort Belvoir, Va.

Trotter, Charles Richard (Jun. '42), Junior Hydr. Engr., Dept. of the Interior, Box 138 (Res., 702 West 13th St.), Rolla, Mo.

Ver Planck, Warburton King (Jun. '42), Draftsman, Anaconda Copper Mining Co., 25 Broadway, New York, N.Y. (Res., 21 Chestnut St., Salem, Mass.)

Vitale, Ralph Joseph (Jun. '42), Asst. Engr., B. Perini & Sons, Framingham (Res., 39 Neptune Rd., East Boston), Mass.

Westfall, Millard Frank (Jun. '42), Ensign, U.S.N.R., Aberdeen, Idaho.

White, John William (Jun. '42), Junior Civ. Engr., TVA, Douglas Dam, Jefferson City, Tenn. (Res., 421 North 7th St., Oxford, Miss.)

Whyte, Norman James (Jun. '42), Junior Engr., Colorado Fuel & Iron Corp. (Res., 520 East Corona Ave.), Pueblo, Colo.

Wilkes, James Harley (Jun. '42), Ensign, CEC, U.S.N., Asst. Civ. Engr., Navy U.U.E., Care, Postmaster, San Francisco, Calif. (Res., 2011 Russell Heights, Dodge City, Kans.)

Wilkinson, William Robert (Jun. '42), Junior Engr., Pacific Elec. Ry., 6th and Main Sts. (Res., 5188 Pickford St.), Los Angeles, Calif.

Woodbury, Robert Whallon (Jun. '42), Junior Engr., Pacific Elec. Ry., 610 South Main St. (Res., 1861 West 43d Pl.), Los Angeles, Calif.

Wright, James Daniel (Assoc. M. '42), Acting Director, Public Works, Box 60, City Hall, Lynchburg, Va.

Yoder, Thomas Wayne (Jun. '42), Ensign, CEC, U.S.N.R., Care, Officer in Chg., Constr. Naval Training Station, Sampson, N.Y.

MEMBERSHIP TRANSFERS

Acken, Howard Wesner (Jun. '30; Assoc. M. '42), Asst. Supervisor, State Dept. of Conservation and Development, Delaware and Raritan Canal, 342 Academy St. (Res., 127 Clearfield Ave.), Trenton, N.J.

Allen, James Hale (Assoc. M. '29; M. '42), Chf. Engr., Interstate Comm. on the Delaware River Basin, 581 Broad St. Station Bldg., Philadelphia, Pa.

Alsup, William Haskell (Jun. '40; Assoc. M. '42), 1st Lt., U.S. Army, 344th Eng. Regiment, Company A, Army Post Office 510, Care, Postmaster, C.O., New York, N.Y.

Bell, Aubrey Blan (Jun. '38; Assoc. M. '42), 1st Lt., San. Corps, U.S. Army, 17th Gen. Hospital, Camp McCoy, Wis.

Caster, Arthur Dawson (Jun. '40; Assoc. M. '42), San. Engr., Charles H. Hurd, 333 North Pennsylvania St. (Res., 321 East 51st St.), Indianapolis, Ind.

Correale, William Herbert (Jun. '25; Assoc. M. '29; M. '42), Capt., U.S. Army, 37-31 Seventy-ninth St., Jackson Heights, N.Y.

Dowling, Wallace Eugene (Jun. '37; Assoc. M. '42), Bridge and Structural Designer, Union Pacific R.R., 1416 Dodge St. (Res., 3350 North 47th Ave.), Omaha, Nebr.

Ebling, Everett Ernest (Assoc. M. '28; M. '42), Dist. Engr., Bethlehem Steel Co., 400 North Michigan Ave., Chicago, Ill.

Evans, John Joseph (Jun. '36; Assoc. M. '42), Lt. (jg), CEC, U.S.N.R., 125 Queen St., Charleston, S.C.

Fox, Robert Myron (Assoc. M. '19; M. '42), Prof., Civ. Eng., Univ. of Southern California, 3551 South University Ave., Los Angeles, Calif.

Gee, Robert Eugene (Jun. '34; Assoc. M. '42), Lt. (jg), CEC-V (S), U.S.N.R., Public Works, 11th Naval Dist., San Diego (Res., 6383 Brockton Ave., Riverside), Calif.

Griffiths, John David (Jun. '33; Assoc. M. '42), Lt., U.S.N.R., Bureau of Yards and Docks, Washington, D.C. (Res., 113 Glenrose St., Kensington, Md.)

Haberer, John Charles (Jun. '31; Assoc. M. '42), Dist. San. Engr., State Dept. of Health, 34 South St., Middletown, N.Y.

Hammond, Alonzo John (M. '04; Hon. M. '42), Cons. Engr., 120 South La Salle St., Chicago (Res., 1035 Cleveland St., Evanston), Ill.

Jared, John Ballard, Jr. (Jun. '38; Assoc. M. '42), Engr., Am. Republics Corp., 707 Petroleum Bldg. (Res., 1822 Sul Ross, Apt. 4), Houston, Tex.

Lawson, Lawrence Milton (Assoc. M. '06; M. '18; Hon. M. '42), American Commr., International Boundary Comm., U.S. Dept. of State, First National Bank Bldg., El Paso, Tex.

Milligan, Cleve Henry (Jun. '33; Assoc. M. '42), Engr. (Hydr.), U.S. Engr. Dept., 19 West South Temple (Res., 632 Harrison Ave.), Salt Lake City, Utah.

Moreell, Ben (Assoc. M. '24; M. '32; Hon. M. '42), Rear Admiral, CEC, U.S.N., Chf., Bureau of Yards and Docks, Navy Dept., Washington, D.C.

Odom, Leo Myers (Assoc. M. '35; M. '42), Chf. Engr., State Dept. of Public Works, Capitol Bldg., 10th Floor, Baton Rouge, La.

Queneau, Roland Blaisdell (Assoc. M. '33; M. '42), Field Engr., The Pitometer Co., Inc. 50 Church St., New York, N. Y.

Robley, Grant (Jun. '37; Assoc. M. '42), Instr., Civ. Eng., Yale Univ., 51 Prospect St., New Haven, Conn.

Rouse, Hunter (Assoc. M. '36; M. '42), Prof. Fluid Mechanics, State Univ. of Iowa, Associate Director in Chg. of Laboratory, Iowa Inst. of Hydr. Research, Hydraulics Laboratory, Iowa City, Iowa.

Somervell, Brehon Burke (M. '25; Hon. M. '42), Lt. Gen., Corps of Engrs., U.S. Army, Chf. Constr. Div., Quartermaster Corps, Room 2014 Railroad Retirement Bldg., Washington, D.C.

Stern, Ernest George (Jun. '40; Assoc. M. '42), Research Engr., Virginia Polytechnic Inst., Box 361, Blacksburg, Va.

Stine, William Virgil (Jun. '33; Assoc. M. '42), Asst. Engr., Signal Corps, Radar Laboratory, Camp Evans, Belmar, N.J. (Res., 182 South Pardee St., Wadsworth, Ohio.)

Taylor, Charles Bagwell (Assoc. M. '26; M. '42), Lt. Comdr., U.S.N.R., 3418 Navy Bldg., Washington, D.C. (Res., 2807 North Glebe Rd., Arlington, Va.)

Tomb, Charles Emerson (Jun. '35; Assoc. M. '42), Lt. (jg), U.S.N.R., Landis St., Coopersburg, Pa.

Warlam, Arpad Antal (Jun. '37; Assoc. M. '42), Research Asst., Harvard Eng. School (Res., 3 Craigie Circle), Cambridge, Mass.

Webster, Howard Elwyn (Jun. '38; Assoc. M. '42), Maj., Corps of Engrs., U.S. Army, 834th Engr. Battalion (Aviation), Army Post Office 517, Care, Postmaster, New York, N.Y.

Wilson, David Mathias (Assoc. M. '30; M. '42), Prof., Civ. Eng., Univ. of Southern California, 3551 University Ave. (Res., 919 Fourth Ave.), Los Angeles, Calif.

Woodward, Sherman Melville (M. '18; Hon. M. '42), Chf., Water Control Planning Engr., TVA, 503 Union Bldg., Knoxville, Tenn.

REINSTATEMENTS

Bayley, Edgar Alcander, M., reinstated Oct. 12, 1942.

Beadles, Charles Edward, Jun., reinstated Nov. 6, 1942.

Burdette, Charles Roland, M., reinstated Oct. 26, 1942.

Carpenter, Richard Townsend, Jun., reinstated Oct. 19, 1942.

Clausnitzer, John, M., reinstated Oct. 28, 1942.

Davis, Robert Olin, Assoc. M., reinstated Oct. 31, 1942.

Fitzgerald, John Paul, Assoc. M., reinstated Oct. 16, 1942.

Hall, Benjamin Mortimer, Jr., M., reinstated Nov. 5, 1942.

Hughes, Hoffman Castleton, Jun., reinstated Oct. 19, 1942.

Kerr, Horace Scott, M., reinstated Nov. 6, 1942.

Messer, Merton William, Assoc. M., reinstated Oct. 13, 1942.

Applications for Admission or Transfer

Condensed Records to Facilitate Comment from Members to Board of Direction

December 1, 1942

NUMBER 12

The Constitution provides that the Board of Direction shall elect or reject all applicants for admission or for transfer. In order to determine justly the eligibility of each candidate, the Board must depend largely upon the membership for information.

Every member is urged, therefore, to scan carefully the list of candidates published each month in CIVIL ENGINEERING *and to furnish the Board with data which may aid in determining the eligibility of any applicant.*

It is especially urged that a definite recommendation as to the proper grading be given in each case, inasmuch as the grading must be based upon the opinions of those who know the applicant personally as well as upon the nature and extent of his professional experience. Any facts derogatory to the personal character or professional reputation of an applicant should be promptly communicated to the Board.

Communications relating to applicants are considered strictly confidential.

The Board of Direction will not consider the application herein contained from residents of North America until the expiration of 30 days, and from non-residents of North America until the expiration of 90 days from the date of this list.

MINIMUM REQUIREMENTS FOR ADMISSION

GRADE	GENERAL REQUIREMENT	AGE	LENGTH OF ACTIVE PRACTICE	RESPONSIBLE CHARGE OF WORK
Member	Qualified to design as well as to direct important work	35 years	12 years	5 years RCM*
Associate Member	Qualified to direct work	27 years	8 years	1 year RCA*
Junior	Qualified for sub-professional work	20 years	4 years	
Affiliate	Qualified by scientific acquirements or practical experience to cooperate with engineers	35 years	12 years	5 years RCM*

* In the following list RCA (responsible charge—Associate Member standard) denotes years of responsible charge of work as principal or subordinate, and RCM (responsible charge—Member standard) denotes years of responsible charge of IMPORTANT work, i. e., work of considerable magnitude or considerable complexity.

APPLYING FOR MEMBER

Alexander, Frederick James, Santa Monica, Calif. (Age 43) (Claims RCA 1.4 RCM 15.9) Jan. 1921 to date Structural Engr., Los Angeles Gas & Elec. Corporation (Southern California Gas Co.).

Barnett, Harold Arthur, (Assoc. M.), Pasadena, Calif. (Age 44) (Claims RCA 6.8 RCM 12.1) Feb. 1924 to June 1935 Asst. City Engr., and July 1935 to date City Engr., San Marino, Calif.; also Oct. 1930 to date City Engr., Gardena, Calif., and Feb. 1924 to Sept. 1930 and July 1935 to date in private practice.

Breen, Meyer, San Juan, Puerto Rico. (Age 47) (Claims RCA 11.7 RCM 6.2) Sept. 1941 to date with U.S. Engr. Office, Puerto Rico Dist., as Asst. to Head of Reports Sec., Inspection Div., Head of Reports and Statistics Sec., and (since Sept. 1942) with Contract Sec., Operations Div.; previously Asst. Supt., WPA, Brooklyn, N.Y.

Brest, Alexander (Assoc. M.), Jacksonville, Fla. (Age 48) (Claims RCA 3.3 RCM 19.0) Oct. 1942 to date Major, Corps of Engrs., U.S. Army; previously Secy. and Treas., Duval Eng. and Contr. Co.

Carman, Henry Victor, Bloomington, Ind. (Age 59) (Claims RCA 18.7 RCM 4.6) Sept. 1936 to date with City of Bloomington as

Special Engr., Asst. City Engr., and (since Jan. 1939) City Civil Engr.

Clark, Bradford Norman, Westfield, N.J. (Age 35) (Claims RCA 9.2 RCM 3.7) March 1942 to date. Senior Engr. (San.), U.S. Engr. Office, New York Dist. New York City; previously Constr. Engr. and Gen. Supt., Guy Villa & Sons, Inc., Eng. Contrs., Westfield.

Fox, Joseph Henry, Birmingham, Ala. (Age 40) (Claims RCA 0.4 RCM 15.0) Nov. 1938 to date Owner, Joseph H. Fox & Co., Sales and Cons. Engr.; previously Sales Engr. and Mgr. of Sales Reinforcing Dept., Connors Steel Co.

Franklin, William Robert (Assoc. M.), Newport, R.I. (Age 38) (Claims RCA 8.4 RCM 7.2) Sept. 1940 to date Asst. Public Works Officer, U.S. Naval Operating Base, Newport, R.I., at present Lt. Comdr., CEC, U.S.N.R.; previously with Montgomery Ward & Co., and Cushman's Sons, Inc.

Garrett, Stephen Girard, Miami, Fla. (Age 41) (Claims RCA 6.0 RCM 11.5) March 1933 to date Inspector of Constr. and Prin. Engr., Corps of Engrs., U.S. Army.

Goodall, George Edwin (Assoc. M.), Sacramento, Calif. (Age 48) (Claims RCA 4.9 RCM 16.7) Nov. 1933 to date with U.S. Engr. Office as Engr., Senior Engr. and (since Sept. 1941) Prin. Engr.

Gramatky, Ferdinand Gunner (Assoc. M.), Pasadena, Calif. (Age 36) (Claims RCA 5.3 RCM 7.3) May 1940 to date private practice, engineering construction; since July 1942 Capt., Corps of Engrs., U.S. Army; previously Gen. Supt., Los Angeles Paving Co.

Hampton, Ambrose Gonzales, Raleigh, N.C. (Age 42) (Claims RCA 6.0 RCM 12.2) Feb. 1936 to date with U.S.PRA, as Associate Highway Engr., and (since Dec. 1940) Highway Engr.

Hopkins, Martin Francis (Assoc. M.), Charleston, W. Va. (Age 44) (Claims RCA 5.4 RCM 7.3) April 1934 to Jan. 1940 Senior Structural Engr., and Jan. 1940 to date Chf., Civil Ano Research Sections, Public Service Comm. of West Virginia.

Hutchins, Bion Shepard, Jr., Topeka, Kans. (Age 42) (Claims RCA 3.3 RCM 14.4) Sept. 1942 to date with Jos. W. Radotinsky, Archt.-Engr. at Herington, Kans., Airfield; previously Asst. Engr. with Gentry-Voscamp and Jos. W. Radotinsky, Archt.-Engrs., Topeka, Senior Engr., Kansas Highway Comm.

Johnson, Reuben Milton, Peoria, Ill. (Age 38) (Claims RCA 5.9 RCM 8.6) Sept. 1940 to date Airport Engr. on work for Peoria Municipal Airport for The Pleasure Driveway and Park Dist.; previously with Illinois Div. of Highways.

Jones, Rudolph, Jackson, Tenn. (Age 42) (Claims RCA 8.2 RCM 10.0) June 1933 to date with Tennessee Dept. of Highways, as Jun. Engr., Res. Engr., and (since April 1939) Div. Engr.

Kearney, John Joseph, (Assoc. M.), Pueblo, Colo. (Age 51) (Claims RCA 7.0 RCM 24.0) 1933 to date Cons. Mun. Engr. to municipalities and contractors, at present being Project Mgr. for Midwest Constr. & Asphalt Co. of Chicago on construction at Pueblo Ordnance Depot, Avondale, Colo.

Leh, Alden Wesley, Pittsburg, Calif. (Age 39) (Claims RCA 2.5 RCM 14.3) May 1936 to date Project Engr., The Austin Co.; previously Structural Engr., Alco Products, Inc., New York City.

McDonald, Roland George, East Rochester, N.Y. (Age 40) (Claims RCA 4.5 RCM 10.3) May 1930 to date Village Engr. and Supt. of Public Works, East Rochester.

Manrique Acevedo, Pedro Cesar, Guayaquil, Ecuador, S.A. (Age 38) (Claims RCM 15.6) 1928 to date Constr. Engr. and Power Distribution Engr., Empresa Electrica del Ecuador, Inc.; since 1939 also Prof. Univ. of Guayaquil; 1933 to 1942 Contr.

Marks, Nathaniel Levin, Jr., New Orleans, La. (Age 43) (Claims RCA 6.0 RCM 11.0) 1925 to date with City of New Orleans, as Res. Engr., Prin. Asst. City Engr. and (since 1935) City Engr.

Miller, Maurice Crane, (Assoc. M.), Des Moines, Iowa. (Age 46) (Claims RCA 2.5 RCM 14.2) Oct. 1932 to date Engr., Hawkeye Portland Cement Co.

Moore, Byrd Lee, Miami, Fla. (Age 42) (Claims RCA 6.7 RCM 12.1) Aug. 1942 to date Office Paving Engr., Pan American Airways, Inc.; previously Engr. (Civ.), Board of Rivers & Harbors, Washington, D.C.; with Alabama Highway Dept. in various capacities.

Pyburn, DeWitt Lyman, Baton Rouge, La. (Age 44) (Claims RCA 2.6 RCM 20.5) Jan. 1941 to date Director, Louisiana Dept. of Public Works; previously Chairman, State Planning Comm., Louisiana; State Administrator of 21 CCC camps, U.S.D.A., S.C.S.

Rollent, Victor Twining. Floral Park, N.Y. (Age 38) (Claims RCA 7.8 RCM 5.0) May 1942 to date Computer with Jay Downer, New York City; previously Field Engr. with Doyle and Russell; Chf. Engr. with O'Driscoll & Grove; Area Engr., Mason & Hangar Co.; Chf. Inspector of Paving, New York World's Fair.

Schmitt, Harry Albert, Shorewood, Wis. (Age 40) (Claims RCM 20.5) March 1921 to date with Village of Shorewood, since Aug. 1930 as Village Engr. and Mgr.

Van Dyke, Alfred John (Assoc. M.), Jacksboro, Tex. (Age 35) (Claims RCA 5.8 RCM 2.7) Sept. 1933 to date Asst. Res. Engr. and Res. Engr., Texas Highway Dept.

White, Leon Vincent (Assoc. M.), Manhattan, Kans. (Age 60) (Claims RC 23.0 D 1.7) Oct. 1918 to date with Civ. Eng. Dept., Kansas State Coll. as Instructor, Asst. Prof., Assoc. Prof. and (since Dec. 1941) Prof.

Williams, Ned (Assoc. M.), Ainsworth, Nebr. (Age 40) (Claims RCA 8.0 RCM 7.3) March 1942 to date Capt., Corps of Engrs. U.S. Army, acting as Constr. Officer, on airfield and ordnance work; previously Designer, then Asst. Bridge Engr., Wyoming Highway Dept.

Wright, Samuel Robert (Assoc. M.), College Station, Tex. (Age 41) (Claims RCA 8.6 RCM 6.0) Sept. 1923 to June 1928 Instructor and Sept. 1937 to April 1942 Asst. Prof., and April 1942 to date Acting Head of Mun. and San. Eng. Dept., Texas Agricultural and Mechanical Coll.

Young, Gilman Boardman, Elmhurst, Ill. (Age 41) (Claims RCA 8.0 RCM 8.7) July 1941 to date Senior Structural Engr., U.S. Engr. Corps, Chicago Dist. Office; previously Project Engr., Battey & Childs, Cons. Engrs., Chicago; Senior Structural Engr., Physical Plant Dept., Univ. of Illinois.

Zagoren, Louis Isaac, Cincinnati, Ohio. (Age 50) (Claims RCA 10.0 RCM 18.4) May 1942 to date Chf. Structural Engr., A. M. Kinney, Inc., Cons. Engr.; previously Cons. Engr. in general practice.

Zahorik, Peter Anton (Assoc. M.), Milwaukee, Wis. (Age 47) (Claims RCA 8.9 RCM 11.7) Feb. 1923 to date Engr., Kalman Steel Co. (after Dec. 1931 Bethlehem Steel Co.)

APPLYING FOR ASSOCIATE MEMBER

Behner, John Louis, Los Angeles, Calif. (Age 34) (Claims RCA 2.0) Nov. 1940 to June 1941 Asst. Engr., and June 1941 to date Eng. Designer, Leeds, Hill, Barnard & Jewett; previously Office Engr., Chalmers & Barnett; Eng. Draftsman and Rodman, Shell Oil Co.

Beskin, Leon, New York City. (Age 30) (Claims RCA 1.7 RCM 5.6) June 1942 to date Research Engr. & Designer, Ingalls Iron Works Co.; previously Crane Designer and Chf. Engr., Brooklyn (N.Y.) Contrs. Machinery Exchange; with Entreprise Rouzaud & Fils, Paris, France, as Reinforced Concrete and Structural Steel Designer, being Asst. to Chf. Engr., and (later) Chf. Engr.

Biermann, Arthur Edward (Junior), St. Louis, Mo. (Age 33) (Claims RCA 3.7) Dec. 1940 to date Asst. Engr., Terminal Railroad Assoc. of St. Louis; previously Pile Inspector, later Detailer, Stone & Webster Eng. Corporation, Venice, Ill.; Asst. Engr., Office Engr., Estimator, and Asst. Supt., Samuel Kraus Co.

Blessing, Charles Alexander, Chicago, Ill. (Age 30) (Claims RCA 2.0 RCM 1.2) October 1941 to date City Planner, Chicago Plan Comm.; previously Planning Engr., New Hampshire State Plan Comm.; with Louis C. Cyr, Bldg. Contr., Lawrence, Mass., responsible for Mt. Vernon Park plan; Research Asst., Massachusetts Inst. of Technology; Field Asst. to F. J. Adams, Consultant, Gloucester, Mass.

Buchwalter, Samuel Joseph, New York City. (Age 40) (Claims RCA 15.0) March 1925 to date with Republic Fireproofing Co., as Engr. and Estimator, and (since March 1930) Chf. Estimator.

Buie, Glenn Smith, Key West, Fla. (Age 37) (Claims RCA 3.8 RCM 1.0) March 1942 to date Asst. Civ. Engr., and Associate Civ. Engr., Bureau of Yards and Docks, U.S. Navy; previously Asst. Contr. Engr., and Associate Contr. Engr., FSA; Asst. Engr., SCS.

Colgan, John Clifton, New Orleans, La. (Age 62) (Claims RCA 27.6) Feb. 1935 to date with Operations Div., WPA, as Statistician, Constr. Engr., Operations Engr., Acting Dist. Mgr., and (at present) Field Engr.

Foster, William Southmayd (Junior), New York City. (Age 32) (Claims RCA 6.9 RCM 1.1) Jan. 1942 to date Eng. Editor, *The American City;* previously Asst. Engr., Stanley Eng. Co., Muscatine, Iowa; with Iowa Highway Comm.

Fratar, Thomas Joseph (Junior), Camp Claiborne, La. (Age 29) (Claims RCA 3.2) Oct. 1942 to date with U.S. Army; previously Structural Designer, Shreve, Lamb, & Harmon, New York City; Technical Writer, Yale Bureau for Street Traffic Research, Yale Univ.; with Madigan-Hyland, Long Island City.

Friedman, Herman David, Brooklyn, N.Y. (Age 37) (Claims RCA 5.9) April 1938 to date Office Engr. and Computer, New York City Tunnel Authority.

Gallenkamp, Edgbert Harry, San Antonio, Tex. (Age 33) (Claims RCA 2.2 RCM 0.4) May 1942 to date Civ. Engr., Frank T. Drought, Cons. Engr.; previously with WPA in various capacities.

Goodman, William Ward, Little Rock, Ark. (Age 34) (Claims RCA 4.4 RCM 3.5) June 1930 to April 1942 (except Dec. 1931–Nov. 1932) with Arkansas Highway Comm. in various capacities, finally as Highway Engr.; May 1942 to date Archt. Designer (Structural), Sanderson-Porter, Pine Bluff Arsenal.

Grant, Walter Schuyler, Jr., Ft. Belvoir, Va. (Age 31) (Claims RCA 1.2) April 1941 to date with Corps of Engrs., U.S. Army as 1st Lieut., Capt., and (at present) Major; previously Instructor, Virginia Military Inst.

Gunder, Dwight Francis, Ft. Collins, Colo. (Age 36) (Claims RCA 5.0 RCM 3.2) Sept. 1926 to date with Colorado State Coll. as Instructor and Asst. Prof. of Mathematics, Assoc. Prof. of Mathematics and Civ. Eng., and (since July 1942) Assoc. Prof. of Civ. Eng.; since Sept. 1939 also Research Assoc. in Hydraulics, Eng. Experiment Station.

Hall, Howard Washington, Corona, Calif. (Age 57) (Claims RCA 32.9) March 1929 to date Mgr., Exchange Lemon Products Co.

Hardy, James Barron, Los Angeles, Calif. (Age 47) (Claims RCA 7.2) Sept. 1938 to date Designer, Southern California Gas Company, Los Angeles, Calif.; previously with EMSCO Derrick & Equipment Co.

Harkrider, Clovis Joseph (Junior), Ft. Worth, Tex. (Age 32) (Claims RCA 3.6 RCM 4.0) June 1941 to date Engr. (Squad Chf.), War Public Works Div., FWA; previously City Plan Engr. and adviser, Ft. Worth, Tex.; Engr. Examiner, PWA; Res. Engr., North Texas Agricultural College, Arlington, Tex.

Johnson, George Dugan (Junior), York, Pa. (Age 29) (Claims RCA 1.9) Feb. 1937 to date with S. Morgan Smith Co. as Draftsman, Hydr. Designer, and (since Jan. 1941) Hydr. Engr.

Keilch, John Fitzgerald, Tulsa, Okla. (Age 31) (Claims RCA 7.0) Oct. 1941 to date Engr., E. I. Du Pont de Nemours & Co., Wilmington, Del.; previously with U.S. Engr. Dept. in various capacities.

McPherson, Ralph Harrison, Greenville, S.C. (Age 32) (Claims RCA 3.5 RCM 5.0) 1931 to date with J. E. Sirrine & Co. in various capacities, since 1937 as Engr. in Chg.

McWethy, Pearson Kemp, Mt. Clemens, Mich. (Age 41) (Claims RCA 4.4 RCM 10.5) March 1942 to date with Huron-Clinton Metropolitan Authority; previously with Macomb County, Michigan; Technical Adviser on drain cases in Federal Court.

Pepin, Dick Gordon, Denver, Colo. (Age 29) (Claims RCA 2.4 RCM 2.0) April 1942 to date Engr. and Designer, Davis & Wilson, Archts.-Engrs., Buckley Field; previously with U.S. Army Engrs., as Cost Engr. and Civ. Engr. for Area Engr.; City Engr., Pampa, Tex.

Peterson, Frank Gustaf Eric, Bozeman, Mont. (Age 44) (Claims RC 2.1 D 1.6) Sept. 1941 to date Asst. Prof. of Civ. and Gen. Eng., Montana State Coll.; previously Instructor, Univ. of Minnesota.

Philbrick, William Hunt (Junior), Keene, N.H. (Age 33) (Claims RCA 12.5) June 1929 to date with New Hampshire Highway Dept. as Rodman, Chf. of Survey Party, Asst. Engr., and (since June 1942) Asst. Div. Engr.

Price, Westcott Wilkin, Jr. (Junior), Tooele, Utah. (Age 32) (Claims RCA 3.7 RCM 1.6) June 1942 to date Asst. Chf. Engr. with Intermountain Contrs. (Tooele Ordnance Depot); previously with Ford J. Twaits Co. and others as Project Engr., Field Engr., Chf. Engr., and Office Engr.; Asst. Div. Engr., Southern California Edison Co., Ltd.

Prout, Paul Judd, Provo, Utah. (Age 30) (Claims RCA 3.6 RCM 0.7) April 1942 to date Associate Engr., Utah-Pomeroy-Morrison Co.; previously Eng. Draftsman, Long Beach (Calif.) Harbor Dept.; Eng. Aide, U.S. Engrs., War Dept., Los Angeles.

Regnier, Raymond Cobington, Jr., Huntsville Arsenal, Ala. (Age 27) (Claims RCA 4.0 RCM

When JETTING is a Must

YOU'RE SAFE WITH MONOTUBES
—AND AHEAD OF SCHEDULE, TOO!

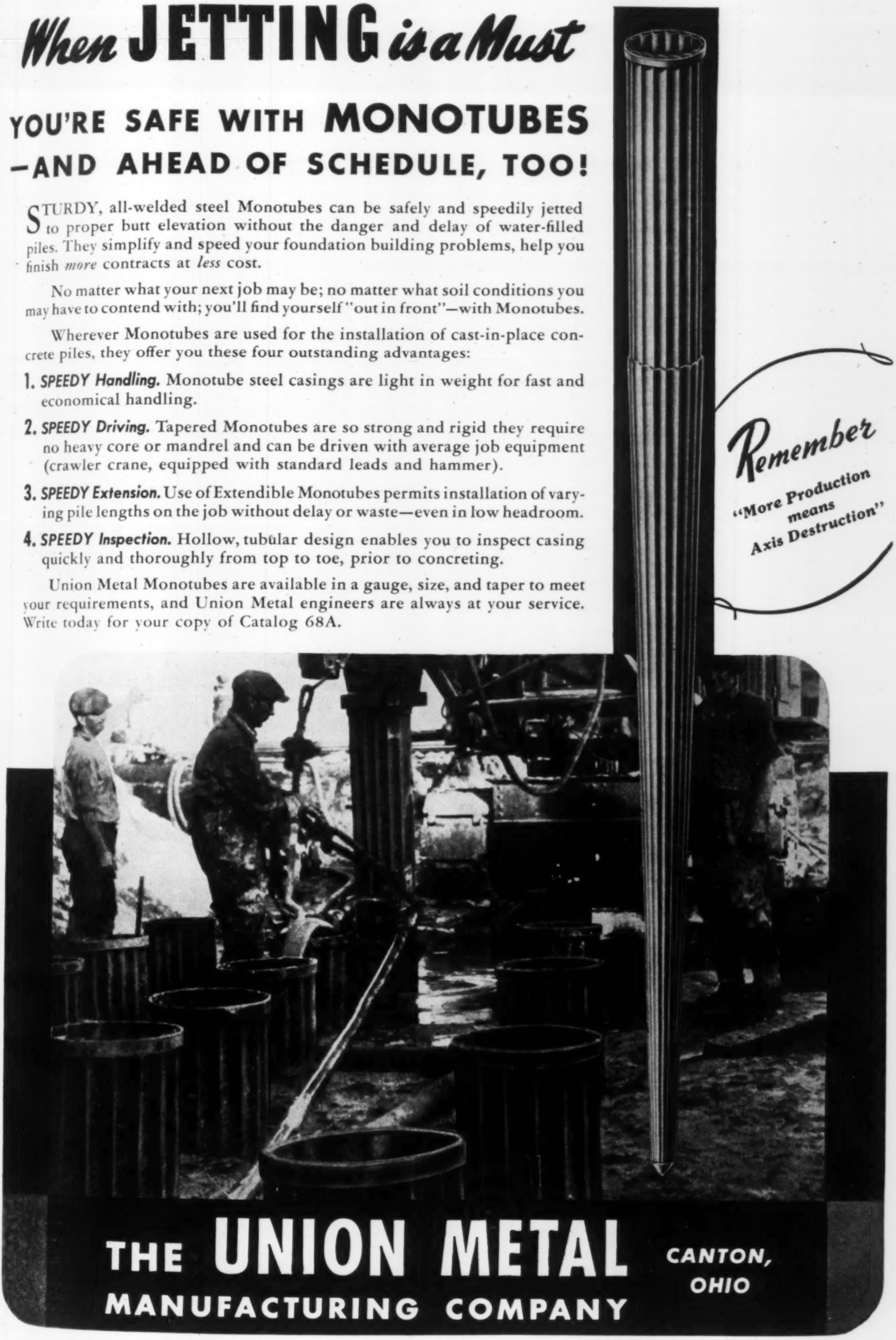
STURDY, all-welded steel Monotubes can be safely and speedily jetted to proper butt elevation without the danger and delay of water-filled piles. They simplify and speed your foundation building problems, help you finish *more* contracts at *less* cost.

No matter what your next job may be; no matter what soil conditions you may have to contend with; you'll find yourself "out in front"—with Monotubes.

Wherever Monotubes are used for the installation of cast-in-place concrete piles, they offer you these four outstanding advantages:

1. **SPEEDY Handling.** Monotube steel casings are light in weight for fast and economical handling.
2. **SPEEDY Driving.** Tapered Monotubes are so strong and rigid they require no heavy core or mandrel and can be driven with average job equipment (crawler crane, equipped with standard leads and hammer).
3. **SPEEDY Extension.** Use of Extendible Monotubes permits installation of varying pile lengths on the job without delay or waste—even in low headroom.
4. **SPEEDY Inspection.** Hollow, tubular design enables you to inspect casing quickly and thoroughly from top to toe, prior to concreting.

Union Metal Monotubes are available in a gauge, size, and taper to meet your requirements, and Union Metal engineers are always at your service. Write today for your copy of Catalog 68A.



THE UNION METAL MANUFACTURING COMPANY
CANTON, OHIO

1.4) Jan. 1942 to date Capt., Chemical Warfare Service, U.S. Army; July 1936 to Jan. 1942 Associate Engr., Whitman, Requardt & Smith, Cons. Engrs., Baltimore, Md.

Roudebush, Edgar Alton, Topeka, Kans. (Age 39) (Claims RCA 5.0 RCM 1.7) May 1928 to Jan. 1929, May 1929 to March 1942 and Oct. 1942 to date with Kansas Highway Comm. as Instrumentman, Res. Engr. and (since May 1929) Squad Chf. and Senior Engr. Grade A.

Swanson, Harry Archibald, Fargo, N.D. (Age 46) (Claims RCA 8.8 RCM 1.5) Feb. 1926 to Feb. 1931 and June 1931 to date Engr., Eng. Dept., City of Fargo, appointed Asst. City Engr. July 1942; in the interim substituting for Asst. Prof. in Civ. Eng., North Dakota Agricultural Coll.

Tripp, Orval Welton, Salina, Kans. (Age 41) (Claims RCA 4.4 RCM 5.2) July 1935 to date Engr., Paulette & Wilson (Wilson & Co., Engrs.), since July 1941 also Office Mgr.

Vargas, George Warren, Santa Barbara, Calif. (Age 47) (Claim s RCA 16.1) Sept. 1941 to Feb. 1942 Senior Engr. and Inspector, and Feb. 1942 to date San. Engr. at Camp Cooke, Calif., for Leeds, Hill, Barnard and Jewett; previously with J. G. White Co.

Vaughn, Francis Arthur, College Station, Tex. (Age 32) (Claims RCA 1.2) Feb. to June 1940 and Sept. 1940 to date Instructor, Civ. Eng. Dept., Agricultural & Mechanical Coll. of Tex.; previously with State Highway Comm. of Kansas.

Williams, Leslie, Providence, R.I. (Age 36) (Claims RCA 6.0) April 1941 to date Director, Civic Planning and Traffic Board, Providence Chamber of Commerce; previously Research Associate in Traffic Eng. and City Planning, Bureau for Street Traffic Research, Comm. on Transportation, Yale Univ., New Haven, Conn.

APPLYING FOR JUNIOR

Copp, William Maxwell, Cocoli, Canal Zone. (Age 25) March 1942 to date Jun. Engr., 3d Locks project, Panama Canal; previously with Illinois Div. of Highways as Aggregate Inspector and Jun. Highway Engr.

Garvin, Daniel Ford, Cincinnati, Ohio. (Age 25) (Claims RCA 1.5) Aug. 1941 to date Jun. Engr., U.S. Geological Survey.

Gilder, Jack, Seattle, Wash. (Age 29) (Claims RCA 0.9) June 1939 to date with U.S. Army Engrs. as Asst. Eng. Aide, and (since March 1941) Jun. Engr.

Musham, William Charles, St. Louis, Mo. (Age 27) (Claims RCA 0.8) May 1941 to date with Corps of Engrs., U.S. Army, as 2d Lieut., 1st Lieut. and (since March 1942) Capt., being Asst. to Dist. Engr., St. Louis, Mo., Engr. Dist.

Picco, John Francis, Brooklyn, N.Y. (Age 24) March 1941 to date Structural Designer, Fredrick R. Harris, Inc.; previously with The Lummus Co.

Rorabaugh, Matthew Irvin, Louisville, Ky. (Age 26) (Claims RCA 1.3) Sept. 1938 to July 1941 Jun. Engr., and July 1941 to date Asst. Engr., U.S. Geological Survey, Water Resources Branch.

Tilden, Norman Edgar, Wewoka, Okla. (Age 32) (Claims RCA 1.0) July 1942 to date with Eng. Dept., Oklahoma Pipeline Co.; previously Deputy County Surveyor and County Surveyor, Washington County, Nebr.

Weight, Robert Hogan, Berkeley, Calif. (Age 24) May 1942 to date Designer, Donald R. Warren, Inc., Structural & Civ. Engr.; previously Jun. Engr., U.S. Engr. Office, Los Angeles.

1941 GRADUATE

NORTHWESTERN UNIV.
(B.S. in Civ. Eng.)

	Age
Andrews, Harold Joseph	(23)

1942 GRADUATES

UNIV. OF CALIF.
(B.S. in Civ. Eng.)

Kettner, Karl Herman	(26)

UNIV. OF KANS.
(B.S. in C.E.)

Callahan, Clarence Andrew	(32)
Will, Albert Parks	(29)

UNIV. OF MICH.
(B.S. in C.E.)

Auferoth, John, Jr.	(22)
Beckert, Jack Raymond	(21)
Brewer, Robert Burns	(22)
Elmiger, Frederick John	(23)
Hildinger, John Ross	(23)
Jennings, Sidney James	(24)
Petkoff, Peter Pavloff	(24)
Steffensen, Robert William	(24)

UNIV. OF N. MEX.
(B.S. in C.E.)

Jones, Robert Taylor	(25)
May, Marvin Clark	(29)
Sandoval, Florencio	(27)
Watson, Albert Theodore	(30)

COLL. OF CITY OF N.Y.
(B.C.E.)

Di Giglio, Vito Anthony	(22)
Fox, Samuel	(22)
Mearsheimer, Thomas Joseph	(24)

OHIO STATE UNIV.
(B.C.E., 1942)

Benedum, Wilbert Charles	(22)

UNIV. OF TENN.
(B.S. in Civ. Eng.)

Kirby, Longley Reed	(25)

TEX. TECH. COLL.
(B.S. in C.E.)

Mendell, Herman Robert	(24)

UNIV. OF TEX.
(B.S. in C.E.)

Engbrock, Glenn Harold	(23)

UNIV. OF WIS.
(B.S.)

Wagner, John Otjen	(22

YALE UNIV.
(B.E.)

Harding, Arthur Burt, Jr.	(22)

The Board of Direction will consider the applications in this list not less than thirty days after the date of issue.

Engineering Societies Personnel Service, Inc.

New York, 8 W. 40th St.
Chicago, 211 W. Wacker Dr.
Detroit, 100 Farnsworth Ave.
San Francisco, 57 Post St.
Boston, 4 Park Street

The items listed below have been furnished by the Engineering Societies Personnel Service, Inc., which is under the joint management of the Four Founder Societies. This service is available to members and is operated on a cooperative, non-profit basis. In applying for positions advertised by the Service the applicant agrees, if actually placed in a position through the Service as a result of these advertisements, to pay a placement fee in accordance with the rates as listed by the Service. These rates have been established in order to maintain an efficient, non-profit personnel service and are available upon request. This also applies to registrants whose notices are placed in these columns. All replies should be addressed to the key numbers indicated and mailed to the New York Office.

A weekly bulletin of engineering positions open is available to members of the cooperating societies at a subscription of $3 per quarter or $10 per annum, payable in advance.

Notice

Due to the expansion of the various societies in the Engineering Societies Building, the New York office of the Engineering Societies Personnel Service, Inc., has found it necessary to secure new quarters. These quarters are located at 8 West 40th Street, and will be occupied as of December 1, 1942. This move in no way disrupts the cooperation between the Engineering Societies and the Personnel Service.

MEN AVAILABLE

Executive Engineer; M. Am. Soc. C.E.; 45; B.S.C.E., Cornell University; native American; member of leading technical societies; over 20 years' broad construction experience in transport, utility, and industrial work. Proved ability as construction manager and job organizer on large work, both domestic and foreign; also experienced in developing new work and negotiating new contracts. At present chief engineer of well-known concern doing large amount of government work from coast to coast. C-946.

Engineer; M. Am. Soc. C.E.; Am. Soc. Testing Materials; Am. Soc. Engrg. Education; C.E. degree. Experience: Teaching engineering mechanics, research and testing of engineering materials, administration and supervision. C-947.

Graduate Civil Engineer; Jun. Am. Soc. C.E.; B.C.E.; 16 months' inspection on large war plant in South; desires position with company doing foreign construction work. Location immaterial. C-948.

Field Engineer, Concrete and Soil Technician; Jun. Am. Soc. C.E.; 28; B.S.C.E., Lafayette '35; M.S.C.E., Columbia '36; $2\frac{1}{2}$ years' highway construction; 3 years in charge of central soil testing laboratory; 1 year in charge of concrete and soil inspection and testing; also shift engineer, major earth dam and tunnel project. C-949.

Graduate Civil Engineer; Jun. Am. Soc. C.E.; citizen of India; master of science, Massachusetts Institute of Technology, 1940; trained in sanitary engineering, hydraulics, soil mechanics, and structures; seeks position in design or construction for the duration. Available upon completion of doctorate degree at State University of Iowa, December 1942. C-950.

Civil Engineer; Assoc. M. Am. Soc. C.E.; 34; 12 years' experience in private practice on design and construction of water and sewerage works, including supply and treatment. Past 2 years in charge of design, specifications, and construction of utilities, including airfield grading, drainage, and paving on Army air bases and cantonments. C-951.

POSITIONS AVAILABLE

Graduate Civil Engineer, who has had a good educational course in soil mechanics as well as some practical experience in this work. A laboratory man is not wanted. Some knowledge of foundation design would be helpful. Temporary. Salary, \$2,000–\$2,600 a year. Location, New York, N.Y. W-136.

Supervising Engineers, civil, to coordinate activities of men doing inspection of construction projects, primarily industrial buildings. Will also approve invoices and payrolls. Salary, \$2,600–\$3,800 a year. Location, anywhere in United States. Headquarters, Washington, D.C. W-787.

Recent Graduate Civil Engineers for use in field construction and general layout work. Will take a few with construction experience. Salary, \$2,080–\$3,380 a year. Location, South. W-812.

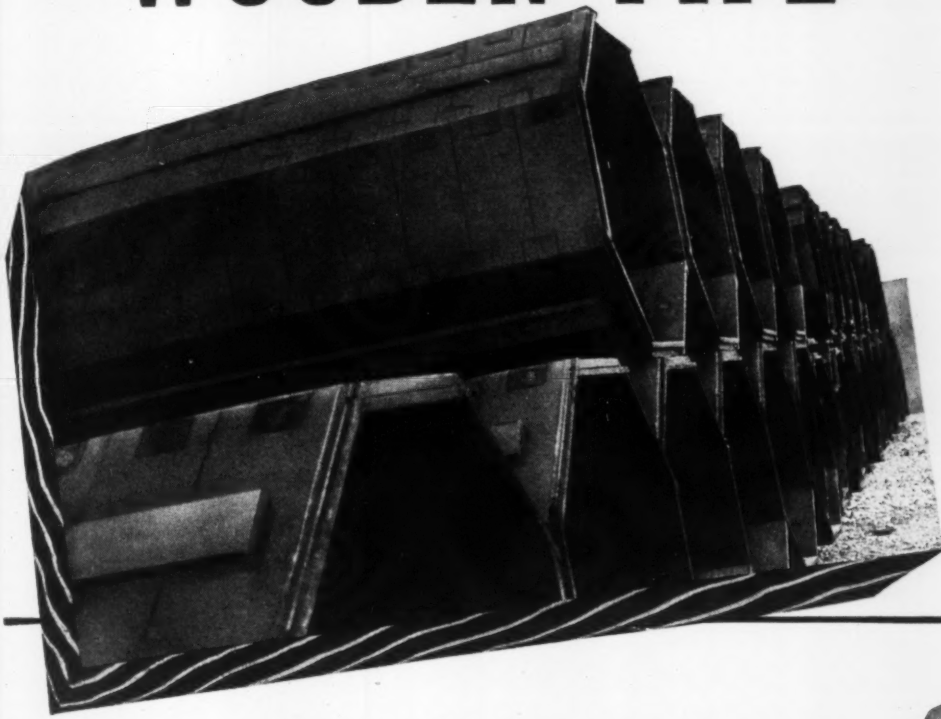
Construction Engineer to do field layout, interpretation of plans, and supervision. Duration, 3 to 4 months, with possibility of being transferred to other projects upon completion. Salary, \$4,056 a year. Location, Ohio. W-1143.

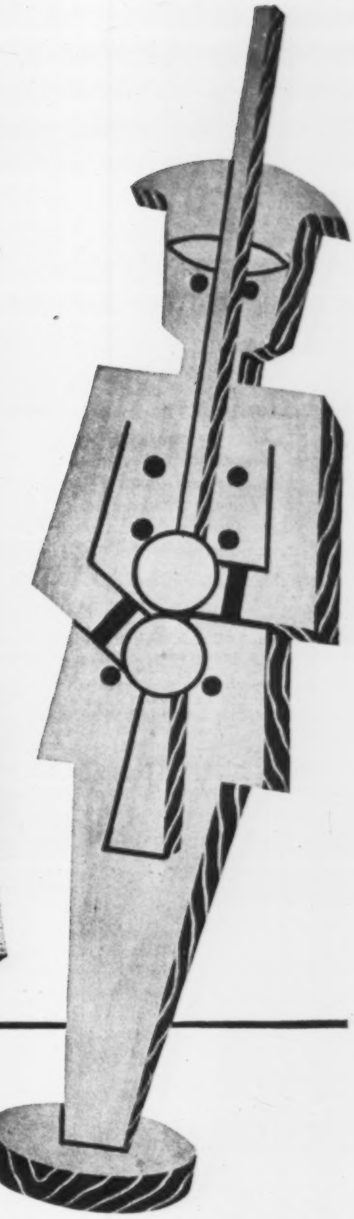
Commissions. Civil Engineers for officer candidates in U.S. Army. Must be 30–59 years of age. Must have had at least 5 years' experience supervising the construction of highways, airports, or the dirt removal—that is, drainage, leveling, etc. Location, anywhere. W-1199.

Civil Engineer for field work on the erection of utilities. Must be able to do minor design for field changes and layout work. Temporary. Salary, \$4,000–\$4,600 a year. Location, Virginia. W-1265.

Civil or Electrical Engineer, young, for appraisal and valuation of public utility properties. Must be free to travel. Permanent. Sal-

WOODEN PIPE





OR WOODEN GUNS?

Naturally tanks, guns and ships come first. Steel must not be used in any drainage structure except where engineering integrity demands it. Yet Armco Emergency Wood Pipe offers a practical wartime substitute.

This completely new design in wood pipe requires no steel sheets and bands, wire mesh, metal reinforcing or other critical materials. It is easy to handle and has ample strength to meet engineering standards. Armco Emergency Pipe is designed to outlast the 5 to 10-year period for which most military construction is intended. On more permanent installations, when replacement becomes necessary, a corrugated metal pipe may easily be threaded through or jacked around the wood structure.

Remember that Armco Corrugated Metal Pipe is only on temporary "leave of absence." It will be back with its flexible strength, ease of handling, tight joints, long lengths, and low installation costs. Asbestos Bonded Coatings and thick bituminous pavements will be back too—better than ever before—to guard against corrosion-erosion.

Meanwhile, perhaps we can assist with your drainage problems. The answer may be in the use of nonstrategic materials, or suggestions for repairing and salvaging older structures. Armco Drainage Products Assn., 615 Curtis St., Middletown, O.

ARMCO ARMCO Emergency Pipe

ary, about $2,600 a year. Headquarters, New York, N.Y. W-1291.

Office Engineer experienced in steel and concrete design and, preferably, some piping. Knowledge of water supply desirable. Salary, $4,500–$4,800 a year. Location, Kentucky. W-1301.

Construction Estimator to take off quantities for frame construction, including plumbing, heating, wiring, hardware, etc. Will also be required to assist the superintendent in field construction. Salary, $100 a week. Duration, 4 to 6 months. Location, Connecticut. W-1407.

Draftsmen, civil, with highway department or municipal experience, who are able to calculate grades, design storm drainage systems, lay out sewers, etc. Should be accustomed to working with ink on tracing cloth and should also do good lettering. Base salary for journeyman draftsmen, $3,324 a year, plus overtime; slightly higher for designers. Duration, at least 6 months. Location, West. W-1409.

Building Estimator. Must have had considerable experience on general building estimating. Salary open. Temporary. Location, New York, N.Y. W-1430.

Project Superintendent for housing project. Must have been a construction superintendent in charge of a large project and be able to coordinate the several phases of the work. Salary open. Temporary. Location, South. W-1431.

Civil Engineers for heavy construction work with contracting division. Locations, either Delaware or Pennsylvania. W-1433 *(b)*.

Sanitary Engineer with experience in sanitary and public health, particularly on field work on inspection and investigation. Must be resident of New York, N.Y. Salary, $4,250 a year. Location, New York, N.Y. W-1455.

RECENT BOOKS

New books of interest to Civil Engineers donated by the publishers and filed in the Engineering Societies Library, or in the Society's Reading Room, will be found listed here. The notes regarding the books are taken from the books themselves and are edited by members of the staff of the Society or of the Library. Those books which are in the Library may be borrowed by mail by Society members for a small handling charge.

Boiler Feed and Boiler Water Softening, a Boiler Operators' Manual, 3ed. By H. K. Blanning and A. D. Rich. Nickerson & Collins Co., Chicago, 1942. 164 pp., charts, tables, 11 × 8½ in., cloth, $3.50.

Methods of testing water, the interpretation of tests, and the various treatments available for softening and purifying feed water are discussed in detail in this book. The subject is discussed from the point of view of the operators of power plants, especially small ones of low and medium pressure, where expert chemical assistance is not readily available.

Handbook of Applied Hydraulics. By C. V. Davis. McGraw-Hill Book Co., New York and London, 1942. 1084 pp., illus., diagrs., charts, maps, tables, 9 × 6 in., leather, $7.50.

A general reference work on hydraulics, composed of brief, yet complete, texts on its various branches with practical information on the planning and design of hydraulic works. Hydrology, river regulation, dams, spillways, canals, hydroelectric plants, hydraulic machinery, water supplies, sewerage, irrigation, drainage, and other topics are discussed by eighteen prominent engineers with experience in various fields.

Handbook of War Production. By E. A. Boyan, with a foreword by E. H. Schell. McGraw-Hill Book Co., New York and London. 1942. 368 pp., diagrs., charts, tables, 9½ × 6 in., cloth, $3.

This handbook discusses the problems of management involved in the conversion of plants to the production of war materials, and in increasing the quality and speed of output. It is based upon the experience of pioneer war manufacturers. Among the subjects discussed are the procurement of contracts, materials and supplies, production planning and control, quality control, labor and expansion, conservation of strategic material, industrial accounting in wartime, estimating for war contracts, and subcontracting.

How to Remodel a House. By J. R. Dalzell and G. Townsend. American Technical Society, Chicago, 1942. 528 pp., illus., diagrs., charts, tables, 9 × 5½ in., cloth, $4.75.

The steps involved in remodelling a dwelling or modernizing individual rooms are explained in full detail in this volume, which should prove useful to home owners and others interested. An illustrative example is carried through step by step. Numerous illustrations add to the value of the text.

Industrial Drawing (Pennsylvania State College Industrial Series). By H. R. Thayer. McGraw-Hill Book Company, New York and London, 1942. 195 pp., diagrs., charts, 9 × 6 in., cloth, $1.75.

While this text has been arranged for teaching adult classes, it is hoped that it will be especially useful to those who must study alone. For this reason explanations have been made direct and simple, though as complete as possible under the circumstances.

International Association for Bridge and Structural Engineering. Mémoires, Abhandlungen, Publications, Vol. 6, 1940–41. Published by the General Secretariat in Zurich, copies for sale at A. G. Gebr. Leemann & Co., Stockerstrasse 64, Zurich, Switzerland, 1942. 306 pp., illus., diagrs., charts, tables, 9½ × 6½ in., paper, Swiss francs 25; rm. 15.

The present volume of the Proceedings contains four papers in English, two in French, and ten in German, which have collected at the headquarters of the Association since 1939. The papers discuss various matters related to the theory and practice of bridge and structural engineering.

Introduction to Highway Engineering, 4 ed. By J. H. Bateman. John Wiley & Sons, New York; Chapman & Hall, London, 1942. 459 pp., illus., diagrs., charts, tables, 9½ × 6 in., cloth, $4.

A textbook for students of civil engineering in which emphasis is on fundamental principles and processes. In addition, current practice is described in some detail. This edition has been revised and rearranged. The chapters on roadside improvement, properties of bituminous materials, subgrade stabilization, and the structural design of pavements have been expanded.

A Manual of Engineering Drawing. By H. C. Hesse. The Macmillan Company, New York, 1942. 161 pp., illus., diagrs., 11 × 8 in., paper, $1.50.

This volume is intended as a text and problem manual for defense training and college courses. The text presents the essential principles of descriptive geometry before those of engineering drawing, in the conviction that graphic theory should precede application and industrial practice. However, the problems and assignments are such that the order of presentation can be reversed if desired.

Materials Testing and Heat Treating (Rochester Technical Series). By W. A. Clark and B. Plehn. Harper and Brothers, New York and London, 1942. 132 pp., illus., diagrs., charts, tables, 9½ × 6 in., cloth, $1.75.

This manual offers a series of laboratory exercises that suggest many commercial acceptance tests, but which have been adapted to ordinary school or college laboratory equipment. The tests have been chosen for their educational value in illustrating fundamental principles as well as for their relation to commercial tests.

Modern Camouflage, The New Science of Protective Concealment. By Maj. Robert P. Breckenridge. Farrar & Rinehart, Inc., New York, 1942. 280 pp., illus., drawings, diagrs., 8½ × 5½ in., cloth, $3.

Written by an engineer officer active in the camouflage section of the Army, this volume offers a concise and reliable account of the bases of protective concealment against attack from the air. Everyone responsible for the safety of factories, public utilities, cities, public buildings, road and rail transportation, military areas, and airfields will find it invaluable.

Modern Wire Rope Digest, 1942 ed. American Chain & Cable Co., Wilkes-Barre, Pa., 1941. 253 pp., illus., diagrs., charts, tables, 7½ × 4½ in., cardboard, $2.50. Wire Rope Recommendations, Supplement to the Modern Wire Rope Digest. American Chain & Cable Co., Bridgeport, Conn., 83 pp., illus., diagrs., 6½ × 4 in., paper, no extra price.

This little handbook contains much practical information on the manufacture of wire rope, the types in use, the selection of rope for various purposes and its maintenance. It is intended as a guide to users.

National Building Code, prepared under the joint sponsorship of the National Housing Administration, Department of Finance, and the Codes and Specifications Section, National Research Council of Canada. Ottawa, Canada, 1941. 422 pp., diagrs., charts, tables, 9 × 6 in., linen, $1.

This code has been prepared under the sponsorship of the National Housing Administration and the National Research Council of Canada by representatives of many professional and trade associations. Structural requirements, protection from fire, and health and sanitary requirements are covered. The code is recommended to municipalities as a model.

Natural Trigonometric Functions to Seven Decimal Places for Every Ten Seconds of Arc, together with Miscellaneous Tables, 2 ed. By H. C. Ives. John Wiley & Sons, New York; Chapman & Hall, London, 1942. 351 pp., diagrs., tables, 10 × 7 in., cloth, $9.

These tables give the natural sines, cosines, tangents, and cotangents. They also include eleven other tables frequently needed by surveyors. Errors in the previous edition have been corrected, and a table giving the tangents and cotangents to single seconds from 0 to 2 degrees have been added. The tables are clearly printed and very readable.

Poisson's Exponential Binomial Limit: Table I—Individual Terms; Table II—Cumulated Terms. By E. C. Molina. D. Van Nostrand Co., New York, 1942. 47 pp., tables, 11 × 8 in., paper, $2.75.

These tables give the numerical limiting values of the individual and cumulative terms for values of the parameter from 0.001 to 100. Originally prepared by the Bell Telephone System for use in solving switching and traffic problems, they are also very useful in handling inspection data and for solving problems of sampling.

Postwar Planning in the United States. By G. B. Galloway. Twentieth Century Fund, New York, 1942. 158 pp., tables, 9 × 6 in., paper, 60 cents.

This report summarizes the activities, personnel, and publications of the various agencies engaged in research upon the economic and social problems that will face us when the war ends. A considerable bibliography is appended.

Report of the Committee on Sedimentation 1940–1941, with charts for the Determination of Detrital Minerals. National Research Council, Division of Geology and Geography, Washington, D.C., March 1942. 110 pp., charts, tables, 11 × 8½ in., paper, $1. (Separate copies of charts, 50 cents.)

This pamphlet includes the general report of the chairman, and also ten supplementary reports upon special investigations in the field of sedimentation. Among these are "Tables for the Determination of Detrital Minerals," prepared by R. Dana Russell.

Roadway and Runway Soil Mechanics Data. Permanency of Clay Soil Densification. (Engineering Experiment Station Series No. 67, School of Engineering.) By H. C. Porter. Texas Agricultural and Mechanical College, College Station, Texas, 1942. 121 pp., illus., charts, tables, 9 × 6 in., paper, gratis.

This bulletin on the permanency of clay soil densification is the first of a series of eleven which are to deal with soil mechanics. The experimental procedures used in determining the data are described, the results are discussed, and a synopsis of the conclusions reached is given. Both tables and graphs are used in presenting the numerical results.

Table of Sine and Cosine Integrals from 10 to 100, prepared by the Federal Works Agency, Work Projects Administration for the City of New York, conducted under the sponsorship of and for sale by the National Bureau of Standards, Washington, D.C., 1942. 185 pp., charts, tables, 11 × 8 in., cloth, $2.

This volume supplements the two previous volumes of "Sine, Cosine and Exponential Integrals" by providing sine and cosine integrals calculated to ten decimal places, for the range of x between 10 and 100, at intervals of 0.01. These integrals are encountered in many branches of physics and electrical engineering, and the volume is expected to meet the needs of workers in these fields.

Tables of Probability Functions, Vol. 2, prepared by the Federal Works Agency, Work Projects Administration for the City of New York, conducted under the sponsorship of and for sale by the National Bureau of Standards, Washington, D.C., 1942. 344 pp., tables, 11 × 8 in., cloth, $2.

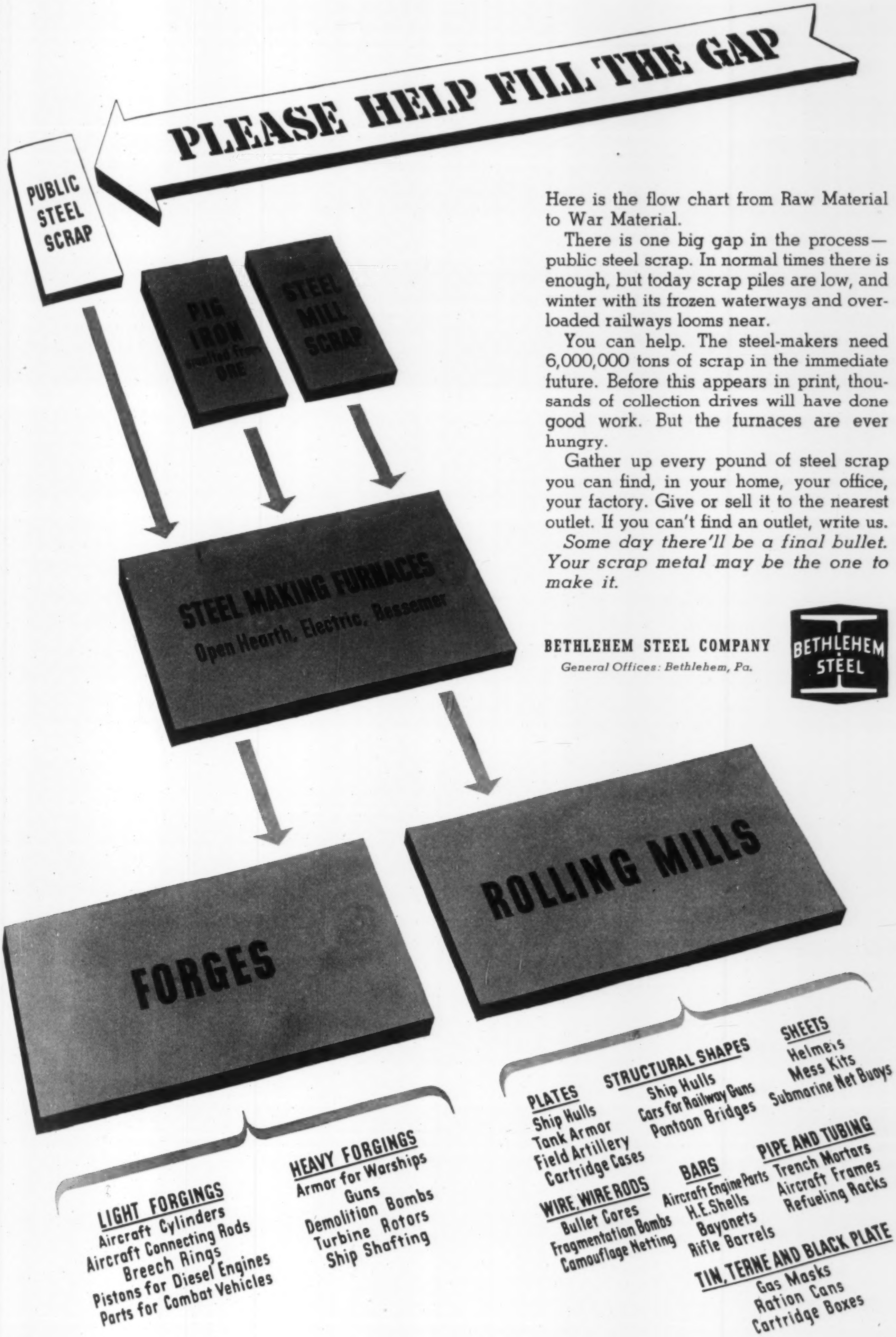
The two functions tabulated here are frequently called the ordinate and area, respectively, of the normal frequency curve, and are of fundamental importance in statistics, especially in testing the significance of a deviation in a normally distributed variate and in fitting normal distributions to observations. The tables extend to fifteen decimal places, at intervals of 0.0001 for x ranging from 0 to 1, and at intervals of 0.001 for x ranging from 1 to 7.8.

Weather Study. By D. Brunt. Ronald Press Co., New York, 1942. 215 pp., diagrs., charts, maps, 8 × 5 in., cloth, $2.25.

A simple textbook for readers with no previous knowledge of meteorology. The book is intended especially for candidates for the air forces.

Welding. By J. A. Moyer. McGraw-Hill Book Co., New York and London, 1942. 185 pp., illus., diagrs., charts, tables, 9 × 6 in., cloth, $2.25.

The major part of this textbook is devoted to oxyacetylene and arc-welding methods, especially applied to iron and steel. The apparatus and technique are described in a general way, with information on the metallurgy of welds, test methods, and costs. A chapter on metal cutting is included, and other methods of welding (resistance, atomic-hydrogen, thermit) are described briefly. The text is clear and accurate.


PLEASE HELP FILL THE GAP
PUBLIC STEEL SCRAP
PIG IRON smelted from ORE
STEEL MILL SCRAP
STEEL MAKING FURNACES
Open Hearth, Electric, Bessemer
FORGES
ROLLING MILLS
LIGHT FORGINGS
Aircraft Cylinders
Aircraft Connecting Rods
Breech Rings
Pistons for Diesel Engines
Parts for Combat Vehicles
HEAVY FORGINGS
Armor for Warships
Guns
Demolition Bombs
Turbine Rotors
Ship Shafting
PLATES
Ship Hulls
Tank Armor
Field Artillery
Cartridge Cases
STRUCTURAL SHAPES
Ship Hulls
Cars for Railway Guns
Pontoon Bridges
SHEETS
Helmets
Mess Kits
Submarine Net Buoys
WIRE, WIRE RODS
Bullet Cores
Fragmentation Bombs
Camouflage Netting
BARS
Aircraft Engine Parts
H.E. Shells
Bayonets
Rifle Barrels
PIPE AND TUBING
Trench Mortars
Aircraft Frames
Refueling Racks
TIN, TERNE AND BLACK PLATE
Gas Masks
Ration Cans
Cartridge Boxes

Here is the flow chart from Raw Material to War Material.

There is one big gap in the process—public steel scrap. In normal times there is enough, but today scrap piles are low, and winter with its frozen waterways and overloaded railways looms near.

You can help. The steel-makers need 6,000,000 tons of scrap in the immediate future. Before this appears in print, thousands of collection drives will have done good work. But the furnaces are ever hungry.

Gather up every pound of steel scrap you can find, in your home, your office, your factory. Give or sell it to the nearest outlet. If you can't find an outlet, write us.

Some day there'll be a final bullet. Your scrap metal may be the one to make it.

BETHLEHEM STEEL COMPANY
General Offices: Bethlehem, Pa.

BETHLEHEM STEEL

WYTEFACE
"A"
TRADE MARK
STEEL TAPES

K&E
REG. U. S. PAT. OFF.
I'LL TAKE THE WHITE ONE EVERY TIME!
LF 3
LF 4

GRADUATED IN INCHES OR TENTHS

EASY-TO-READ, *raised* black graduations on crack-proof white surface . . . resist abrasion from rock, sand, scraping over rails, pipe, concrete, etc. In all sizes and types—in cases or reels. Ask your dealer—or write for catalog.

EST. 1867
KEUFFEL & ESSER CO.
NEW YORK • HOBOKEN, N. J.
CHICAGO • ST. LOUIS • SAN FRANCISCO • LOS ANGELES • DETROIT • MONTREAL

Current Periodical Literature

Abstracts of Magazine Articles on Civil Engineering Subjects

Selected items for the current Civil Engineering Group of the Engineering Index Service, 29 West 39th Street, New York, N.Y. Every article indexed is on file and may be borrowed from the Engineering Societies Library. Photoprints will be supplied at the cost of reproduction, 25 cents per page to members of the Founder Societies (30 cents to all others), plus postage.

BRIDGES

Concrete, Demolition. Wrecking of Old Concrete Building Provides Interesting Data. *Eng. News-Rec.*, vol. 129, no. 11, Sept. 10, 1942, p. 357. In spite of poor concrete and obsolete design, building of 1910 vintage proved difficult to demolish; design and disposition of reinforcing steel was faulty but building frame showed remarkable rigidity; resistance to collapse mentioned as favorable indication of performance of modern structures which may be subjected to undue shock.

Garages, Underground. Union Square Garage San Francisco, S. A. Carrighar. *Architect & Engr.*, vol. 150, no. 2, Aug. 1942, pp. 19–28. Design features of four-story underground garage, capable of parking as many cars as will line curbs of 108 city blocks.

Underpinning. Underpinning Holds Shop Wall as Plant Addition Is Built Alongside. *Construction Methods*, vol. 24, no. 7, July 1942, pp. 42–45, 112, 114, 116, and 118. Details of underpinning of south foundation wall of two-story machine shop in Long Island City, N.Y., which was required before 50 by 85-ft addition could be built alongside existing 96 by 185-ft shop to increase plant capacity.

CONCRETE

Construction, Forms. Dual Sets of Mobile Forms Speed Construction of Concrete Barrel Roofs. *Construction Methods*, vol. 24, no. 9, Sept. 1942, pp. 42–45 and 122. To speed operations on storage buildings at Navy supply depot contractors put double sets of traveling barrel-roof forms in each of three buildings erected simultaneously during first stage of program; use of six complete sets of mobile forms in three buildings enabled constructors to make roof pours on five working days each week.

Construction, Forms. Planned Formwork Speeds Construction. *Eng. News-Rec.*, vol. 129, no. 9, Aug. 27, 1942, pp. 302–304. Complete plans for forms and their erection and careful attention to details enable 100 carpenters to prepare column and deck forms for average of 25,000 sq ft of concrete slab daily on multi-story housing project; plywood is used for all forms with each piece detailed for particular location; long boom cranes with gooseneck jibs place concrete to roof over thirteenth floor without use of runways and buggies.

Jetties. Pre-Cast Concrete Jetties Create Beaches and Prevent Shore Erosion, S. M. Wood. *Concrete*, vol. 50, no. 8, Aug. 1942, pp. 2–4. Details of pre-cast reinforced concrete units and their assembly into series of cribs to produce permeable jetties; layout plan and side elevation of pre-cast jetty under construction in Evanston, Ill., given; construction procedure.

Plants, California. Cement Plant for Shasta Dam. *Engineer*, vol. 174, no. 4512, July 3, 1942, pp. 13–14. Illustrated description of plant of Permanente Corp. Similar descriptions, indexed in *Engineering Index* 1941, from various sources.

Products. Pre-Cast Concrete Replaces Scarce Metals and Keeps Products Plants Busy. *Concrete*, vol. 50, no. 8, Aug. 1942, pp. 14–16. Concrete masonry fences around war plants; fuel oil storage tanks; storage cellars of plain concrete; grain storage tanks; fruit and vegetable storage.

Retaining Walls. Design of Concrete Retaining Walls—III, O. Albert. *Concrete*, vol. 50, no. 8, Aug. 1942, pp. 33–35. Formulas for design of cantilever type of reinforced concrete retaining wall are given.

Roads and Streets. Saving Steel on Heavy-Duty Concrete Pavements, A. A. Anderson. *Roads & Bridges*, vol. 80, no. 8, Aug. 1942, pp. 30–31 and 83–84. Since only function of distributed steel is to hold together faces of slab at cracks, it is obvious that, if formation of intermediate cracks can be prevented, no steel need be used; proper spacing of transverse expansion joints will practically eliminate formation of intermediate cracks and insure adequate amount of load transference at contraction joints without requiring use of dowels.

CONSTRUCTION INDUSTRY

Construction Equipment. Screening Rig Provides Cobble Blankets for Slopes of Earth Dam, J. P. Frein. *Construction Methods*, vol. 24, no. 8, Aug. 1942, pp. 39, 118, and 120. Description of job-made mobile screening device used for placing cobble and gravel blanket 1 ft thick on slopes of John Martin Dam—130-ft high earthfill on Arkansas River in Colorado.

Excavation. How to Cut Earth-Moving Costs by Proper Use of Mechanical Equipment, K. F. Park. *Eng. & Contract. Rec.*, vol. 55, no. 31, Aug. 5, 1942, pp. 20–21. Practical methods of increasing yardage and cutting costs in earth moving; job planning and layout; use of rooters.

DAMS

Design. U.S. Water Supply Practice, A. E. Kelso. *Am. Water Works Assn.—J.*, vol. 34, no. 7, July 1942, pp. 984–1034. Report on recent developments in American water supply practice; design, construction methods, and performance features of water supply and distribution structures; standard procedures are described covering fields of dam building both in concrete and rolled earth fills; special emphasis on soil mechanics, particularly as applied to earth-fill structures.

Earth. Application of Principles of Soils Mechanics to Rolled-Fill Earth Dams, D. F. Glynn. *Instn. Engrs. Australia—J.*, vol. 14, no. 6, June 1942, pp. 139–146. Investigation of all relevant characteristics of foundations at possible sites and of all construction materials within convenient haul forms one of first steps in consideration of any project; methods of soil testing in connection with rolled filled dams; design methods; typical construction methods; practical problems associated with American structures of this kind.

FLOW OF FLUIDS

Measurement. Charts Solve Multiple-Reservoir Problem, J. A. Novoro. *Eng. News-Rec.*, vol. 129, no. 9 Aug. 27, 1942, pp. 300–301. Determination of individual flows from three or more reservoirs used for multiple-storage water supply may be obtained graphically by preparing set of charts showing relationship between friction loads in various parts of system; steps to be followed in preparing such charts, and work necessary to determine individual flows when combined discharge is known, are given.

Stream Gaging. River Flow Gauging, A. Linford. *Civ. Eng.* (London), vol. 37, nos. 431 and 432, May 1942, pp. 94–97, and June, pp. 121–123. Part played by gaging of river flows in various engineering projects connected with sewage disposal, water supply, flood control, etc.; characteristics of flow; flow measurement methods.

FOUNDATIONS

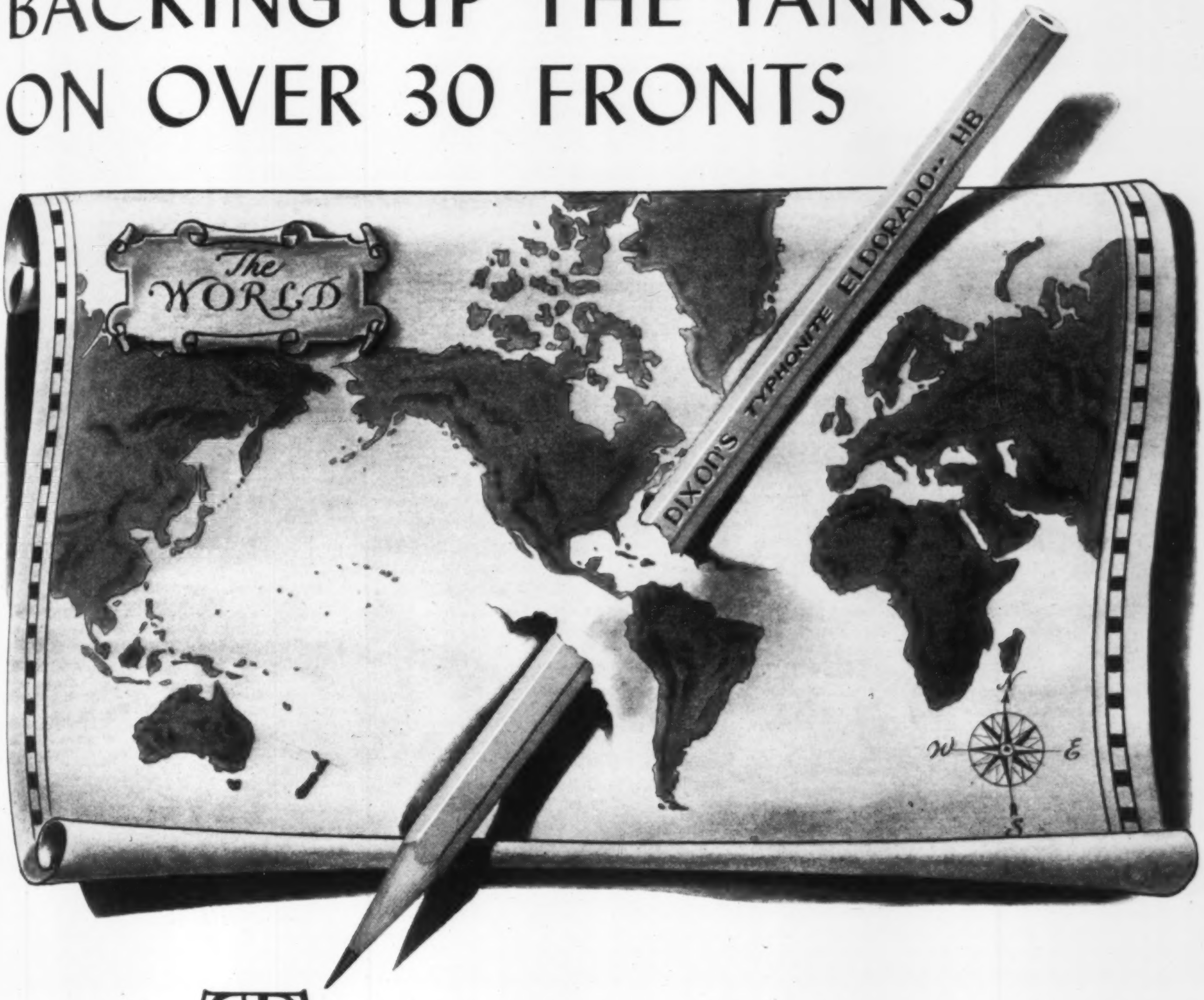
Buildings. War Plant Buildings Without Footings. *Eng. News-Rec.*, vol. 129, no. 11, Sept. 10, 1942, pp. 350–352. Unreinforced concrete floor slabs, integral with wall sills and column pedestals, but without footings, form foundations for most buildings at Ohio ordnance plant; slabs have thickened edges for large buildings; trucking aprons are poured with floors; topsoil is skimmed off at building site and replaced with compacted clay; slab base consists of two 5-in. layers of compacted stone topped with fine stone raising slab above ground for drainage.

Piles, Concrete, Driving. Three-Lead Driver Speeds Pier Work. *Eng. News-Rec.*, vol. 129, no. 9, Aug. 27, 1942, p. 299. Speed of construction on concrete pier in Pacific Northwest increased by putting down reinforced-concrete piles with triple-lead driving rig, assembled on job; rig that was fitted up for driving was derrick barge 120 ft long and of 32-ft beam.

Retaining Walls, Earth Pressure. Lateral Earth Pressures on Retaining Walls, R. R. Minikin. *Engineering*, vol. 154, no. 3991, July 10, 1942, pp. 21–23. Author's assumption is that pressure distribution is trapezoidal; he hopes that, in submitting his theory, professional cooperation in the field will result in further confirmation of his submissions and aid in solution of many current earth-work problems.

Soils, Bearing Capacity. Load-Bearing Characteristics of Landfills, R. Eliassen. *Eng. News-Rec.*, vol. 129, no. 11, Sept. 10, 1942, pp. 369–371. Type and magnitude of settlement of

BACKING UP THE YANKS ON OVER 30 FRONTS



The whole world is our battlefield in this war! To win we have to knock out the enemy wherever he is! You find Yanks in the Solomon Islands, China, Madagascar, India, Egypt, the Belgian Congo...and every other place that's a battlefield today or tomorrow! We've got to get there "firstest with the mostest." And come hell or high water, we shall not fail to deliver the goods.

American draftsmen, engineers and architects rely upon Dixon *Typhonite* ELDORADO to help them crystalize the material of war. ELDORADO's *sharp opaque unmistakable* lines make easy-to-read blueprints. Yes, ELDORADO as a drawing pencil is doing its part to help America shorten this war by days, weeks, months, years!

ELDORADO

PENCIL SALES DEPARTMENT, 38-J12, JOSEPH DIXON CRUCIBLE COMPANY, JERSEY CITY, N. J.

Official Navy Photo

"Jap Slappers!"

NAVY MEN CALL THEM "P. T. BOATS"

Small, light and with an amazing amount of speed, the famed "P. T. Boats" can outmaneuver any destroyer, cruiser or battleship the enemy has ever built. They carry a death sting in their fore and aft torpedo tubes. And for their splendid accomplishments as fighting crafts, they are the pride and joy of the Allied naval men the world over. Their worth has been admirably proven on the field of action.

Layne Pumps and Well Water Systems bear an amazing similarity to the P. T. Boats, on the points of sturdiness. First in genuine quality and second, in that they, too, have proven their worth on the field of action. These Water Systems have been designed and are being built to fulfill a tremendously important task—that of providing millions and millions of gallons of water under any and all conditions. Throughout the Nation, the name Layne is as famed in the water producing field as is the name of P. T. Boats in Naval warfare.

Hundreds and hundreds of Layne Well Water Systems are now serving army camps, naval stations, ship yards, flying fields and munitions plants. Their quality is worthy of outstanding recognition. For late catalogs, bulletins, etc., address

LAYNE & BOWLER, INC.
Memphis, Tenn.

LAYNE
PUMPS & WELL
WATER SYSTEMS

Affiliated Companies

Layne-Arkansas Company............Stuttgart, Ark.
Layne-Atlantic Company..................Norfolk, Va.
Layne-Bowler New England Corp...Boston, Mass.
Layne-Central Company.............Memphis, Tenn.
Layne-Northern Company..........Mishawaka, Ind.
Layne-Louisiana Company.....Lake Charles, La.
Louisiana Well Company...............Monroe, La.
Layne-New York Company..........New York City
Layne-Northwest Company......Milwaukee, Wis.
Layne-Ohio Company................Columbus, Ohio
Layne-Texas Company..............Houston, Texas.
Layne-Western Company..........Kansas City, Mo.
Layne-Western Co. of Minn.....Minneapolis, Minn.
International Water Supply, Ltd...London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

refuse fill, as well as load-bearing characteristics of this material are matters of fundamental importance affecting future utilization of landfills; from studies on New York City fills, it is revealed that consolidation, although rapid for a few months, will continue over a period of years, and tests indicate that uniformly distributed loads up to 2,000 lb per sq ft will be supported on fills that are no more than 2 years old.

INLAND WATERWAYS

RIVERS, IMPROVEMENT. Problems of Sacramento River, R. R. Robertson. *Military Engr.*, vol. 34, no. 202, Aug. 1942, pp. 392–396. Problems attendant upon improvement of Sacramento River as waterway; flood control, hydraulic mining debris control, and maintenance of navigable channels.

IRRIGATION

CANALS, INDIA. Note on Theory, Design, and Construction of Gibb Modules which, without moving parts, give constant discharge within working limits, irrespective of variations in upstream and downstream water levels. India. *Central Irrigation and Hydrodynamic Research—Publ. No. 3*, 1940, 34 pp., 5 supp. plates. Experiments carried out to determine how far theoretical assumptions are justified; standard designs of modules, methods followed from 1928 to 1931 in remodelling and moduling distributaries in Deccan, using Gibb modules.

LAND RECLAMATION AND DRAINAGE

CULVERTS. Comparative Hydrology Pertinent to California Culvert Practice, R. R. Rowe and R. L. Thomas. *Calif. Highways & Pub. Works*, vol. 20, no. 9, Sept. 1942, pp. 6–11. Survey conducted by California Division of Highways on performance of culverts and culvert practice; comparative hydrology, demonstrating necessity for divergence of California practice from that developed for other areas. Bibliography.

ROADS AND STREETS. Design of Roadside Drainage Channels, C. F. Izzard. *Pub. Works*, vol. 73, no. 9, Sept. 1942, pp. 32, 34, 38, and 40. Consideration of erosion control, adequate capacity for normal peak rates of runoff, landscaping, efficient maintenance, ultimate economy, and traffic safety, limited to sections of country where sod can be established readily. Paper before Highway Research Board.

MATERIALS TESTING

BEACHES. Beach Formation by Waves, R. A. Bagnold. *Dock & Harbour Authority*, vol. 23, nos. 261 and 262, July 1942, pp. 59–64, and Aug., pp. 85–89. Results of experiments made in wave tank to discover what ultimate beach profile would be if steel plate were to be replaced by loose shingle or sand, and waves allowed to fashion their own beach; terminology; formation of lower and upper beaches; effect of variations in still water level and of wave amplitude during wave action. From *Instn. Civ. Engrs.—J.*, Nov. 1940.

SOILS. Apparatus for Measuring Shear Strength of Soils, H. Q. Golder. *Engineering*, vol. 153, no. 3989, June 26, 1942, pp. 501–503. Illustrated description of shear box constructed at Building Research Station, in which rate of shear strain is controlled; apparatus similar in principle has already been designed by H. A. Fidler; present apparatus differs from his in several details which result in simpler design and greater ease of operation. See also *Engineering Index*, 1939, p. 1096.

PORTS AND MARITIME STRUCTURES

ATHENS, GREECE. Athenian Port, E. C. Cagle. *Dock & Harbour Authority*, vol. 23, no. 261, July 1942, pp. 49–53. Present situation at Harbor of Piraeus and works necessary to assure its future development.

PILES. SALVAGING. Pile Foundations Salvaged for Shipyard. *Eng. News-Rec.*, vol. 129, no. 11, Sept. 10, 1942, pp. 354–356. Large number of 25,000 piles driven for boat construction yard during last war have been salvaged in their original position and used to speed construction of new yard; all timbers above level where they have been continually wet are rotted but below this level old ways, and adjacent fitting-out pier, are salvaged to provide new facilities quickly.

PORT STRUCTURES, PROTECTIVE COATINGS. Corrosion in Saline Atmosphere, A. W. Soulter. *Dock & Harbour Authority*, vol. 23, 261, July 1942, p. 66. Exclusion of corrosive influences; particular attention given to structures and plant in marine environment; in endeavor to control ravages of corrosion, several methods of protection have been employed with varying degrees of success; use of rubber wax compound proved beneficial. From *Instn. Engrs.-in Charge—Proc.*, vol. 47, no. 2, Sept. 1941.

PORT TERMINALS. Design and Construction of Deepwater Terminal, A. B. Jones. *World Ports*, vol. 4, no. 12, Sept. 1942, pp. 26–29 and 37. Combined rail and water terminal consisting of pier, approach trestle and railroad storage yard at large port, completed by U.S. Engineer Dept.; site selection; dredging; field location for dredging and pile driving; pier and trestle construction; framing; deck construction; fire protection.

ROADS AND STREETS

AIRPORT RUNWAYS. Runway Construction at Aerodrome. *Concrete & Constr. Eng.*, vol. 37, no. 7, July 1942, pp. 256–259. Methods of reducing time required to move plant during construction of runways and aprons at U.S. Army airport described. Previously indexed from *Eng. News-Record*, Jan. 1, 1942.

BANK PROTECTION. Unusual Treatment of Highway Slopes, D. J. Deyoe. *Pub. Works*, vol. 73, no. 9, Sept. 1942, pp. 30 and 43. In modernizing part of road from Peoria, Ill., to Chillicothe, Ohio, widening was made difficult by presence of railroad on one side and high bluff slopes on other; this necessitated cutting back into slopes, giving cuts extending up as high as 99 ft above highway; soil was fine sand covered with mantle of clay interspersed with gravel and sand conglomerate; manner in which slopes were protected from erosion.

BITUMINOUS. Maintenance of Bituminous Macadam Surfaces, J. E. Lawrence. *Pub. Works*, vol. 73, no. 9, Sept. 1942, pp. 11–13 and 26. Outline of latest methods employed by Massachusetts Department of Public Works in constructing and maintaining bituminous macadam asphalt surfaces. Before Highway Officials of North Atlantic States.

CONCRETE. Designing Heavy-Duty Concrete Highways Without Steel. *Eng. & Contract. Rec.*, vol. 55, no. 31, Aug. 5, 1942, pp. 14–16. Design details of heavy duty pavement of uniform section with steel omitted; edge of concrete slab is thickened so that edge and interior thicknesses are stressed equally by any load.

CONSTRUCTION. Cement Spreader and Road-Mix Methods Speed Large Surfacing Jobs. *Eng. News-Rec.*, vol. 129, no. 11, Sept. 10, 1942, pp. 366–368. Better distribution of cement in soil-cement base courses and protection of cement from sudden showers are being obtained in California by use of bulk distributors developed for use in oil-field operations; these traveling mixers operate in sequence process mixture in advance of rolling.

CONSTRUCTION. Heavy Rock Work Features Kentucky Road. *Eng. News-Rec.*, vol. 129, no. 9, Aug. 27, 1942, pp. 305–307. Construction of 4.4-mile access road to Wolf Creek Dam site on Cumberland River; common excavation totaled 100,000 cu yd and rock work 400,000 cu yd; maximum sidehill cut was 135 ft, deepest through cut 40 ft, and highest fill over 300 ft to toe on low side; over 2,000 tons of dynamite were required.

DRAINAGE. How to Cure Wet Subgrades and Prevent Pavement Failure, H. E. Cotton. *Roads & Bridges*, vol. 80, no. 8, Aug. 1942, pp. 27–29 and 91–92. Base drainage considered essential for pavements laid upon subgrade soils which may become unstable upon absorption of moisture; method suggested for proving rapid exit for free water; transverse drains; mud pumping; subdrainage.

FLIGHT STRIPS. First Flight Strip. *Construction Methods*, vol. 24, no. 8, Aug. 1942, p. 47. Brief note on first flight strip completed which is 8,000 ft long and more than 500 ft wide, with runway 7,000 ft by 150 ft paved with concrete 8 in. thick; stabilized soil shoulders surround runway, which is capable of handling largest bombers now being flown by Army Air Forces.

HIGHWAY SYSTEMS, PAN-AMERICAN. Hemisphere Highway to Victory, H. C. Lanks. *Roads & Streets*, vol. 85, no. 8, Aug. 1942, pp. 35–39. Military significance of 16,000-mile highway linking North, Central and South America, constituting vital transportation artery to aid in movement of strategic raw materials.

MAINTENANCE AND REPAIR. How Concrete Pavements Are Protected by Linseed Oil Treatments, H. D. Metcalf and C. W. Allen. *Concrete*, vol. 50, no. 8, Aug. 1942, pp. 36–37. Report on investigation undertaken by Ohio Department of Highways to determine effectiveness of boiled linseed oil treatment of portland cement concrete pavement as protection against harmful action of chemicals used in control of snow and ice; investigation includes also development of practical and economical method for application of linseed oil treatment.

MAINTENANCE AND REPAIR. To Keep Traffic Rolling. *Better Roads*, vol. 12, no. 9, Sept. 1942, pp. 15–16 and 32–34. State and county maintenance operations and programs have been redesigned to afford maximum of service under war-time conditions; report, drawn from experience of sample of representative state and county highway departments, on how maintenance job is being tackled in fall of 1942.

PAVEMENTS, MILITARY CAMPS. Soil-Cement at Camp Livingston, M. L. Cunningham. *Military Engr.*, vol. 34, no. 202, Aug. 1942, pp. 387–389. Road construction including motor parking area using stabilization method considered by author to be satisfactory for carrying all military equipment except tractors with steel grousers.

RAILROAD CROSSINGS, GRADE SEPARATION. Railroad Underpass Aids St. Louis Traffic. W. J.

3 WAYS TO SOLVE YOUR ROAD MAINTENANCE PROBLEMS NOW!

PHONE,

WRITE

OR

WIRE for the TARVIA Field Man

● With new highway construction limited for the duration to military requirements, the proper maintenance of existing roads is more important than ever. Strategic cross-country highways and vital feeder roads must be kept in first class condition to assure mobility for soldiers and industrial workers; for munitions, food and essential supplies.

The responsibility rests with every highway engineer and contractor. Are the roads in your district ready?

There's a grade of Tarvia* just right for every rebuilding, resurfacing or patching requirement. For nearly 40 years this versatile paving material has been helping highway engineers save heavy annual replacement costs and get the most miles out of available highway funds.

Why not discuss your problems with the Tarvia field man? He's ready with helpful, sound advice and cooperation on any highway maintenance problem. All you have to do is phone, wire or write our nearest office. . . .

Barrett Tarvia*

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK

One of America's Great Basic Businesses

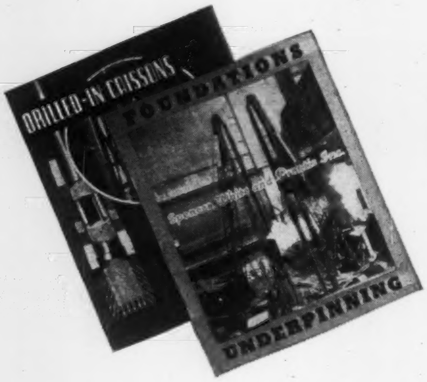
SEND FOR THE NEW BARRETT TARVIA MANUAL →

Chicago . . . Birmingham . . . St. Louis . . . Detroit . . . Philadelphia . . . Boston . . . Providence . . . Rochester . . . Lebanon, Pa. . . Minneapolis . . . Cleveland . . . Hartford . . . Columbus . . . Youngstown . . . Toledo . . . Syracuse . . . Norwood, N.Y. . . . Cincinnati . . . Buffalo . . . Bethlehem . . . Portland, Me.

*Reg. U.S. Pat. Off.

FOUNDATIONS

PRETEST UNDERPINNING
CONCRETE-STEEL PILES
MASS CONCRETE CONSTRUCTION
HEAVY SHORING
DRILLED-IN CAISSONS

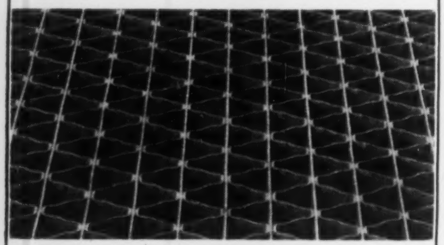


Send for catalogs descriptive of the latest foundation types and methods.

SPENCER, WHITE & PRENTIS, INC.
10 EAST 40th ST. NEW YORK, N. Y.

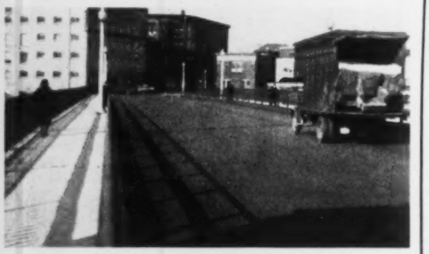
IRVING DECKING

The Open Steel Bridge Pavement
Lightweight • Safe • Economical



ELIMINATES MAINTENANCE

IRVING DECKING stands up under day after day pounding of the heaviest traffic. Records of bridges, where IRVING DECKING has been in service, prove that use of this durable steel mesh pavement practically eliminates maintenance costs



IRVING SUBWAY GRATING CO., INC.
5008 27th Street
LONG ISLAND CITY, NEW YORK

AMERICAN SOCIETY OF CIVIL ENGINEERS FOUNDED 1852

Why do so many ENGINEERS ask for all 24 of the ASCE MANUALS?

These Manuals of Engineering Practice, compiled by men of wide experience and acknowledged authority, contain information useful to the civil engineer in his every-day work. They present facts, briefly and to the point, and should be of value to you. You can get the list of Manuals published to date by mailing the coupon.

American Society of Civil Engineers
33 West 39th Street, New York, N.Y.

Please send, without obligation, complete list of 24 Am. Soc. C.E. Manuals.

Name ....
Address ....
City .... State ....

Hedley. *Eng. News-Rec.*, vol. 129, no. 9, Aug. 27, 1942, pp. 290–292. Last of eight bridges in Wabash R.R.'s 20-year plan of grade separation in St. Louis spans Skinker Blvd.; of through-girder type, more pleasing appearance is achieved by elimination of outside stiffeners; welded alloy steel plate floor supports ballastless track; road traffic is channelized in underpass and for several hundred feet each side, including intersections with approach streets.

WIDENING. Bottlenecks Eliminated on Dangerous Piece of Road at Yuma, Arizona, J. C. Coyle. *Pub. Works*, vol. 73, no. 9, Sept. 1942, pp. 25–26. Hazard of crooked 18-ft pavement and narrow bridge removed by straightening and widening pavement and extending bridge roadway across sidewalk strips.

SEWERAGE AND SEWAGE DISPOSAL

SEWERS, MAINTENANCE AND REPAIR. How Sewers Are Maintained in Boston, Mass., R. P. Shea. *Am. City*, vol. 57, no. 8, Aug. 1942, pp. 45–46. Sewer maintenance practice divided into five classifications: Answering complaints; cleaning batch basins; sewer cleaning; maintaining intercepting sewers, including tide gates, regulators, and sumps; and general repairs. Methods and routine briefly described. Before New England Sewage Works Assn.

SEWERS, STORM. Neglected Items in Storm Sewer Design, J. Wilson. *Eng. News-Rec.*, vol. 129, no. 9, Aug. 27, 1942, pp. 310–311. More accurate designs of storm sewers are possible if engineers will consider frequently neglected features of temperature of falling rain, exposure of slopes to sun as affecting snow melting, quantity and water content of snowfall, and rainfall during periods of snow melting.

SLUDGE DIGESTION. Effect of Yeast on Stabilization of Sewage and Sludge Digestion, H. Heukelekian. *Pub. Works*, vol. 73, no. 9, Sept. 1942, pp. 17–18. Experiments conducted by Department of Water and Sewage Research, New Brunswick, N.J., to determine effect of yeast on stabilization of sewage and on anaerobic sludge digestion indicate that yeast does not hasten either stabilization of sewage or digestion of seeded sludge.

STRUCTURAL ENGINEERING

FLOORS, CONCRETE. Research Proves Value of Pre-Cast Concrete Floor Systems, E. W. Dienhart. *Concrete*, vol. 50, nos. 7 and 8, July 1942, pp. 10–11, 26–27, and 30–31, and Aug., pp. 20–22 and 29. Report on tests conducted by Cement Products Bureau of Portland Cement Assn.; results of tests of strength of joint and of load capacity and performance of floor panels; tests of effect of repeated loading on tee-beam action of pre-cast joist concrete floors; strength tests of various types of hangers used in pre-cast concrete joist floor construction.

TRUSSES, WOODEN. How to Build Timber Trusses for Maximum Strength. *Eng. & Contract Rec.*, vol. 55, no. 36, Sept. 9, 1942, pp. 12–13. Review of various types of timber connectors as used to increase efficiency of timber joints; building timber trusses on job; truss assembly described.

WOODEN CONSTRUCTION. Modern Developments in Design of Timber Structures, I. Langlands. *Instn. Engrs. Australia—J.*, vol. 14, no. 5, May 1942, pp. 115–119. Paper discusses Handbook of Structural Timber Design recently essued by Forest Products Division of Council for Scientific and Industrial Research; purpose of handbook is to provide engineers with basic information necessary for design of timber structures; it gives information on properties of structural timbers used in Australia, together with recommended working stresses, and methods of design of elemental parts of structures.

TRAFFIC CONTROL

STREET TRAFFIC SIGNS, SIGNALS AND MARKINGS. Permanent White Traffic Lines. *Surveyor*, vol. 101, no. 2633, July 10, 1942, pp. 243–244. Use of white surfaced concrete blocks placed in road surface; notes on manufacture of blocks, materials and mix, curing and finish, and method of laying.

TRAFFIC CONTROL, TRAFFIC DIVIDERS. Traffic Divider Provides Built-In Safety on 9 Miles of 4-Lane Parkway—Plain Concrete Design Saves 136 Tons of Steel. *Construction Methods*, vol. 24, no. 8, Aug. 1942, pp. 42–46 and 120–122. Description of traffic divider on Grand Central and Interborough Parkways, New York City; divider, with sloping sides topped out by curved "bullnose" section, is continuous concrete barrier, $14^1/_2$ in. high, built along center line of existing pavement 44 ft wide to separate eastbound and westbound traffic.

TUNNELS

AQUEDUCTS, COLORADO RIVER. Colorado River Reaches California Cities, J. Hinds. *Water Works Eng.*, vol. 95, no. 13, July 1, 1942, pp. 768–772. Colorado River Aqueduct, built by Metropolitan Water District of Southern California, will complete first year of operation in August; it was completed in initial development in July of 1941; from start to finish construction extended over period of $8^1/_2$ years, and was com-

* This illustration shows the "Impact Test" to determine the toughness and ductility of the pipe. While under hydrostatic pressure the pipe is subjected to heavy blows from a 50-pound hammer dropped from successively increased heights. Although not a required acceptance test, it is one of the additional tests regularly made by this Company to further check and maintain the quality of its pipe so that it will adequately meet severe service requirements. *United States Pipe and Foundry Co., General Offices: Burlington, New Jersey.* Sales Offices in Principal Cities.

*** One of a series of controls in operation at each of our plants, beginning with inspection and analysis of raw materials and ending with tests of the finished product, all subject to the central control of our headquarters staff at Burlington.**

U.S.
cast iron
PIPE

Centrifugally or Pit Cast for water, gas, sewerage, drainage and industrial services.

RITECURE
for all Concrete Construction

IN CURING CONCRETE...It's the Solids that Count

The RITECURE film with 60% solids gives wide coverage and perfect curing

Film or membraneous curing of concrete structures is simple and economical. For vertical surfaces it provides about the only practical way of curing at all.

But the film to be fully effective must be impervious over its entire surface and stay that way throughout the critical curing period. Obviously the amount and character of solids remaining after the carrier has evaporated are important.

RITECURE contains 60% solids. It dries into a thin but tough, durable film with considerable elasticity. Its spreading qualities assure full coverage without the need of excess amounts. More than 2,000,000 square yards of concrete a month are being cured with RITECURE.

Buy solids—not solvents.

RITECURE The TRANSPARENT CURE

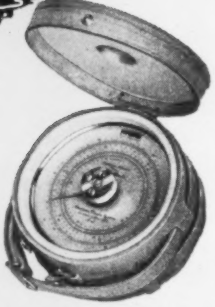
RITECURE *is sold by:*

THOMPSON MATERIALS CO.
204 West Street • New York, N. Y.

CURING MATERIALS CO.
2130 Jane Street • Pittsburgh, Pa.

a product of: THE JOHNSON-MARCH CORPORATION, 52 Vanderbilt Ave., New York, N. Y.

12-JM-3



Speed-Up ALL FIELD SURVEYS!

Preliminary surveys for highway construction, drainage and irrigation systems, dams, water lines, all divisions of civil engineering are speeded up by the *NEW* Paulin Precision Surveying Aneroid. Readings to two feet over a range of 4500 feet are as easy as reading a watch. Other models cover a range of 18,000 feet. Write for complete literature and FREE COPY of the *Paulin Altimetry Manual.*

AMERICAN PAULIN SYSTEM
1847 SOUTH FLOWER STREET
LOS ANGELES, CALIFORNIA

Just call me "Pickle-puss"

This tank has a tremendously important job—for, on proper pickling and cleaning of material for galvanizing depends the strength of the bond. And, one reason that Enterprise galvanizing measures to finest standards for quality is that we regularly test our pickling and acid solutions for contamination and acid strength—and we exercise extreme care on all orders, large or small, in control of this preparatory phase of the work.

ENTERPRISE GALVANIZING COMPANY

2501 E. Cumberland St., Philadelphia, Pa.

"To Economize — Galvanize at Enterprise!"

pleted prior to shortage of, or restrictions on use of, construction materials.

WATER PIPE LINES

MAINTENANCE AND REPAIR. Repairs to Distribution Systems, W. V. Weir. *Water & Sewage,* vol. 80, no. 8, Aug. 1942, pp. 24–25 and 54–56. Types of bomb damage that may be suffered by pipe lines and outline of methods and equipment needed for repair under emergency conditions.

STERILIZATION. Sterilizing Water Mains. *Eng. & Contract Rec.*, vol. 55, no. 37, Sept. 16, 1942, pp. 8–11. General requirements, solution feed, and direct feed of chlorine to water supply after new installations and repairs; procedure for emergency chlorination outlined.

WATER TREATMENT

ACTIVATED CARBON. Where to Apply Activated Carbon for Effective Taste and Odor Control. *Water & Sewage,* vol. 80, no. 7, July 1942, pp. 20 and 40–42. Common points of application are to mixing chamber, filters, and to raw water; addition of carbon at point of adding coagulant; application to partly settled water; application to conduits leading to filters; split treatment; counter-current application; reservoir application.

FILTRATION PLANTS, CHICAGO. Chemical Treatment Plans for South District Filtration Plant, J. R. Baylis. *Am. Water Works Assn.—J.*, vol. 34, no. 9, Sept. 1942, pp. 1397–1404. General plans for treatment procedure based on experimental plant; aluminum sulfate to be used as coagulant, activated carbon for taste and odor removal, chlorine for sterilization, and ammonia for maintenance of residual chlorine in distribution system; silicate treatment; use of large-sized sand grains.

FILTRATION PLANTS, CHICAGO. Conservation of Critical Materials in Design of South District Filtration Plant, F. G. Gordon. *Am. Water Works Assn.—J.*, vol. 34, no. 9, Sept. 1942, pp. 1381–1389. Effect has been made to reduce to minimum quantities of critical materials required for completion of South District Filtration Plant; as result of revised design and temporary omissions, required critical materials have been reduced to tonnage which is less than 25% of materials previously contracted for; quantities required for next year of construction have been cut to 5,200 tons.

PLANTS, BIRMINGHAM, ALA. Water Treatment at Birmingham, N. N. Wolpert. *Water Works Eng.*, vol. 95, no. 17, Aug. 26, 1942, pp. 986–988 and 993. Description of methods and equipment at plant where alum solution is manufactured for use of local purification plant and where boiler room is served by coal taken from company mine and transported over private railroad.

WATER POLLUTION. Present Status of Tests for Organic Pollution Loads, A. M. Buswell and E. C. Dunlop. *Am. Water Works Assn.—J.*, vol. 34, no. 7, July 1942, pp. 1063–1072. Comparative details of four test methods of organic load; BOD test still seems most outstanding; present status of chemical oxidizing agents; biochemical method from standpoint of dilution water and oxygen determination; spectroscopic methods. Bibliography.

WATER WORKS ENGINEERING

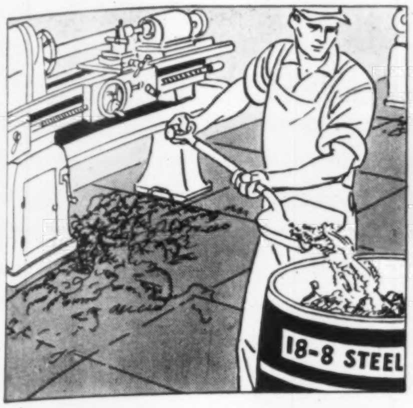
BOTTINEAU, N.DAK. Water Pressure Had to Be Reduced, R. L. Dushinske. *Water Works Eng.*, vol. 95, no. 13, July 1, 1942, p. 773. Experience of Bottineau, N.Dak., served with water collected from springs piped into city; difference in elevation is sufficient to provide pressure of over 100 lb per sq in.; pressure reducer has been installed to relieve plumbing fixtures from excessive strains.

OTTUMWA, IOWA. Water Repumped Four Times, J. H. Reynolds. *Water Works Eng.*, vol. 95, no. 14, July 1942, pp. 826–827 and 854. Centrifugal pumps delivering 5,600 gal per min move raw river water from pump well into preliminary setting basin; there it is detained about 1.25 hours before it begins its course by gravity through 24-in. line to quick-mix chamber of softening plant where, during subsequent 45-min period, water is subjected to mechanically operated slow-mixing process; hydroelectric plant provides current for street lights in business districts.

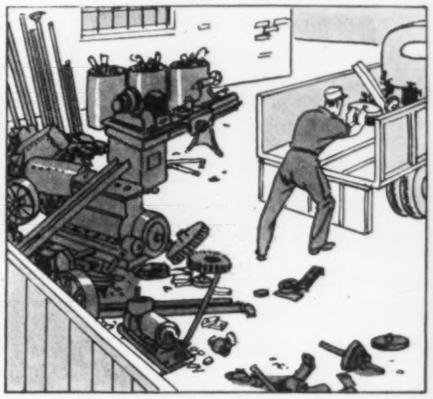
PROTECTION. Water Supply Protection in Civilian Defense, R. E. Tarbett. *Am. Water Works Assn.—J.*, vol. 34, no. 9, Sept. 1942, pp. 1335–1342. Water planning and operation in connection with air-raid protection; report of typical incident following bombing illustrating situations which water works operators must face; chlorination practice in wartime.

WARTIME. Water Service in Wartime London, H. Berry. *Am. Water Works Assn.—J.*, vol. 34, no. 9, Sept. 1942, pp. 1298–1327. Six articles presented as comprehensive study of wartime water works problems of London metropolitan area; protective measures of filtration and chlorination; precautions against pollution and other dangers; repair of air raid damage to mains; water distribution by tank wagon; utilization of private wells and general organization of water authorities; sterilization of repair water mains.

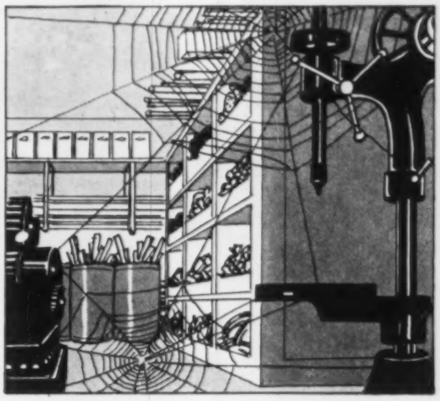
Collect Your Scrap



1. Segregate your *regular scrap*—turnings, stampings, filings, all the metal waste produced in your plant—by its alloy content. You thus insure its re-use where it is needed most—and you also get a higher price for the scrap.



2. Clean out your *junk*—old or obsolete machinery, pipe, pumps, shafting, dies, jigs, tools, engines, electrical apparatus—the abandoned equipment that is overlooked in routine scrap collections. All this metal can be used now.



3. Turn in the *cobweb* scrap—the equipment that has been gathering dust in the corner for an emergency. Outdated machinery and tools, extra fixtures, patterns, stocks, unused metal buildings—they are needed today.

SCRAPPY SAYS:

Yes sir, we've got to have scrap. It takes scrap to make steel. And it takes lots of steel to win a war. If you aren't already regularly selling your scrap,

HERE'S WHAT TO DO:

Call your junk man . . . or send it to the collection station for the Local Salvage Committee . . .

or give it to the Boy and Girl Scouts or other Civic Collection Agencies.

Your scrap will be removed promptly and speeded on its way to steel mills for re-use. The faster your plant contributes its unused or waste metal, the sooner that metal can be put to work again—in guns, tanks, and planes.

FOR VICTORY
BUY
UNITED STATES
WAR
BONDS
AND
STAMPS

For further information, get in touch with your local WPB office, or write to the Bureau of Industrial Conservation, War Production Board, Washington, D. C.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York, N. Y.

Electromet
Trade Mark
Ferro-Alloys & Metals

THE AXIS WANTS
YOUR BUSINESS
GIBBONS
U.S.

THIS is more than a war of mechanical monsters clashing in the night . . . more than a war of production.

It is a war for markets—*your* markets! The Axis wants your business—wants to destroy it once and for all.

With so much at stake, there is no doubt you will want to do everything you can to meet this Axis threat. Two ways are open: Speed production and put 10 percent of your income into WAR BONDS! The only answer to enemy tanks and planes is *more* American tanks and planes—and your regular, month-by-month purchases of War Bonds will help supply them. Buy now *and keep buying*.

THE GOAL: 10% OF EVERYONE'S INCOME IN WAR BONDS

When you install the Pay-Roll War Savings Plan (approved by organized labor), you not only perform a service for your country but for your *employees*. Simple to install, the Plan provides for regular purchases of War Bonds through voluntary pay-roll allotments.

Write for details *today!* Treasury Department, Section R, 709 12th St. NW., Washington, D. C.

EVERYBODY EVERY PAYDAY 10%

War Savings Bonds

This space is a contribution to Winning the War by
CIVIL ENGINEERING

INDEX OF PRODUCTS

ACETYLENE
Air Reduction Sales Co.

ACETYLENE GENERATORS
Air Reduction Sales Co.

AIRPORT DRAINAGE
Armco Drainage Products Assn.
Lock Joint Pipe Co.

AIR RAID SHELTERS
Armco Drainage Products Assn.

ALLOYS, FERRO
Electro Metallurgical Co., Unit of Union Carbide and Carbon Corp.

ALTIMETERS
American Paulin System

ALUMINUM, STRUCTURAL
Aluminum Co. of America

ASPHALT PLANK BRIDGE AND INDUSTRIAL FLOORING
Philip Carey Mfg. Co.

BARS, ALUMINUM
Aluminum Co. of America

BARS, IRON AND STEEL
Bethlehem Steel Co.

BLOWER PIPE, STEEL, FOR VENTILATION PURPOSES
Lock Joint Pipe Co.

BORINGS, TEST
MacArthur Concrete Pile Corp.
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

BRIDGES
Bethlehem Steel Co.

BRIDGE FLOORS, GRATING
Irving Subway Grating Co., Inc.

BRIDGE PLANKS, MINERAL SURFACED ASPHALT
Philip Carey Mfg. Co.

BUILDINGS, STEEL
Bethlehem Steel Co.

CAISSONS
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

CONCRETE, CURING
Johnson-March Corp.

CONCRETE REINFORCEMENT
Bethlehem Steel Co.

CONTRACTORS
MacArthur Concrete Pile Corp.
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

CORRUGATED SHEETS, ALUMINUM
Aluminum Co. of America

CRIBBING, METAL
Armco Drainage Products Assn.

CULVERTS, CAST IRON
Cast Iron Pipe Research Assn.
U. S. Pipe & Foundry Co.

CULVERTS, CORRUGATED IRON AND SHEETS
Armco Drainage Products Assn.

CULVERTS, REINFORCED CONCRETE
Lock Joint Pipe Co.

CURING COMPOUNDS
Johnson-March Corp.

DAMP-PROOF COMPOUNDS
Barrett Division, Allied Chemical and Dye Corp.
Philip Carey Mfg. Co.

DRAFTING INKS
Louis Melind Co.

DRAFTING INSTRUMENTS AND MATERIALS
Keuffel & Esser Co.

DRAINS, PERFORATED IRON
Armco Drainage Products Assn.

DRAINS, REINFORCED CONCRETE
Lock Joint Pipe Co.

DRAWING SUPPLIES
Joseph Dixon Crucible Co.
Keuffel & Esser Co.

ENGINEERS
MacArthur Concrete Pile Corp.
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

ENGINEERING INSTRUMENTS
American Paulin System
Keuffel & Esser Co.

FERRO-ALLOYS
Electro Metallurgical Co., Unit of Union Carbide and Carbon Corp.

FILLER, ASPHALT
Philip Carey Mfg. Co.

FLOORING, ALUMINUM
Aluminum Co. of America

FLOORING, GRATING
Irving Subway Grating Co., Inc.

FLUX, WELDING, BRAZING, ETC.
Air Reduction Sales Co.

FOUNDATIONS
MacArthur Concrete Pile Corp.
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.
Union Metal Manufacturing Co.

GALVANIZING AND GALVANIZED PRODUCTS
Enterprise Galvanizing Co.

GAUGES, ACETYLENE, OXYGEN
Air Reduction Sales Co.

GRATING, STEEL FLOORING
Irving Subway Grating Co., Inc.

INKS, DRAFTING
Louis Melind Co.

INKS, WATERPROOF, PIGMENT, DRAWING
Keuffel & Esser Co.

INSTRUMENTS
American Paulin System
Buff & Buff Co.
Keuffel & Esser Co.

JOINTS, EXPANSION, PAVING
Barrett Division, Allied Chemical & Dye Corp.
Philip Carey Mfg. Co.

LETTERING GUIDES
Keuffel & Esser Co.

LEVELS
Buff & Buff Co.
Keuffel & Esser Co.

MACHINERY, PIPE CUTTING AND BEVELING
Air Reduction Sales Co.

MEASURING TAPES
Keuffel & Esser Co.

METAL CONNECTORS FOR TIMBER JOINTS
Timber Engineering Co.

METAL TERMITE SHIELDS
Timber Engineering Co.

NICKEL AND ITS ALLOYS
International Nickel Co., Inc.

Continued on page 23

INDEX OF PRODUCTS

Continued from page 22

Oxygen
Air Reduction Sales Co.

Paints
Barrett Division, Allied Chemical & Dye Corp.

Paint Pigment, Aluminum
Aluminum Co. of America

Paper, Drawing and Tracing
Keuffel & Esser Co.

Paving Materials
Barrett Division, Allied Chemical & Dye Corp.

Pencils
Joseph Dixon Crucible Co.

Penstocks
Bethlehem Steel Co.
Lock Joint Pipe Co.

Piles, Concrete
MacArthur Concrete Pile Corp.
Raymond Concrete Pile Co.
Union Metal Manufacturing Co.

Piles, Steel Bearing
Bethlehem Steel Co.

Piles, Steel Shell
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.
Union Metal Manufacturing Co.

Piling, Steel Sheet
Bethlehem Steel Co.
Union Metal Manufacturing Co.

Pipe, Cast Iron
Cast Iron Pipe Research Assn.
U. S. Pipe & Foundry Co.

Pipe, Reinforced Concrete
Lock Joint Pipe Co.

Pipe Fittings, Cast Iron
Cast Iron Pipe Research Assn.
U. S. Pipe & Foundry Co.

Plastic, Asphalt
Philip Carey Mfg. Co.

Pumps
Layne & Bowler, Inc.

Regulators, Oxyacetylene
Air Reduction Sales Co.

Road Oils
Barrett Division, Allied Chemical & Dye Corp.

Road Surfacing Materials
Barrett Division, Allied Chemical & Dye Corp.

Roofing Materials
Barrett Division, Allied Chemical & Dye Corp.
Philip Carey Mfg. Co.

Rope, Wire
Bethlehem Steel Co.

Sewer Pipe, Reinforced Concrete
Lock Joint Pipe Co.

Sheets, Aluminum
Aluminum Co. of America

Sheets, Iron and Steel
Bethlehem Steel Co.

Shoring
Spencer, White & Prentis, Inc.

Stacks
Bethlehem Steel Co.

Steel, Structural
Bethlehem Steel Co.

Steel Shells
MacArthur Concrete Pile Corp.

Steps, Safety Grating
Irving Subway Grating Co., Inc.

Storm Sewers, Corrugated Iron
Armco Drainage Products Assn.

Subaqueous Intakes and Outfalls, Reinforced Concrete
Lock Joint Pipe Co.

Surveying Instruments
American Paulin System
Buff & Buff Co.
Keuffel & Esser Co.

Tanks
Bethlehem Steel Co.

Tar
Barrett Division, Allied Chemical & Dye Corp.

Termite Shields
Timber Engineering Co.

Timber Joint Connectors
Timber Engineering Co.

Torches, Welding and Cutting
Air Reduction Sales Co.

Towers, Steel
Bethlehem Steel Co.

Track, Industrial and Portable
Bethlehem Steel Co.

Transits
Buff & Buff Co.
Keuffel & Esser Co.

Underpinning
MacArthur Concrete Pile Corp.
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

Waterproofing Materials
Barrett Division, Allied Chemical & Dye Corp.

Waterproofing, Membrane
Philip Carey Mfg. Co.

Water Supply Equipment
Layne & Bowler, Inc.

Water Supply Pipe, Reinforced Concrete
Lock Joint Pipe Co.

Welding and Cutting Apparatus
Air Reduction Sales Co.

Well Water Systems
Layne & Bowler, Inc.

Wire Rope and Strands
Bethlehem Steel Co.

Wood Preservatives
Barrett Division, Allied Chemical & Dye Corp.

Alphabetical Index to Advertisers shown on page 24

The Society reserves the privilege of rejecting advertisements inconsistent with its ethical procedure

Send for a Sample
OF
Justrite
DRAFTING INK

Notice how freely this new drawing ink flows. It will not cake in the bottle or on your drafting pen. You will be pleased, too, with the superior reproductions and fine work you can obtain with Justrite.

Offered in twenty highly waterproof colors. ¾-ounce quill-stopper bottle 25¢ at your dealers'. Also available in larger sizes.

FOR YOUR SAMPLE BOTTLE write
The Louis Melind Co., Dept. V.
362 W. Chicago Avenue, Chicago, Ill.

Justrite
DRAWING INK
Waterproof
LOUIS MELIND CO.
CHICAGO
Justrite
DRAWING INK

It can be Your Library Department!

A trained staff and a fully equipped library would be a valuable addition to your company. The Service Bureau of the Engineering Societies Library can be that new department in your organization, yet more adequately manned and better equipped than any individual organization library could possibly be.

Use this service. Over 4,000 bibliographies on engineering subjects are on file. 150,000 engineering texts and files of every worthwhile periodical are available for further research to meet your specific needs. A letter, a telephone call or a telegram will place the Service Bureau at your service.

Use the service of *your* Engineering Library
The charges cover only the cost of the service and represent but a fraction of the value you will receive.

The Engineering Societies Library
29 West 39th Street, New York, N. Y.

BUFF
TRADE MARK TRADE MARK

WORLD FAMOUS FOR 74 YEARS

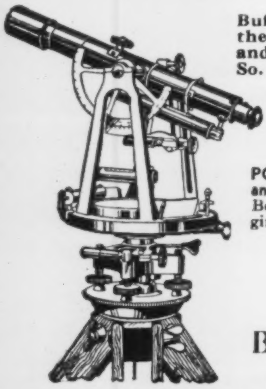
Transits and Levels for Civil and Mining Engineers

Buff precision and design are continuously in the forefront.

ENGINEERS and contractors know that BUFF performance is accurate and sure—with adjustments that hold permanently.

THE BUFF "X" TELESCOPE

has the finest and highest definition and simplest lens system. It is useful when the light is dim.



Buff is used almost exclusively on the largest works in this country and Canada and Mexico and So. America.

Astronomical lens experts.
All makes—intelligently repaired and regraduated by Factory Experts.

The finest work at the LOWEST POSSIBLE COST. Reliability and guaranteed work. A special Souvenir Plumb Bob sent gratis to graduate Civil Engineers.

THE Greatest ACCURACY
THE Hardest BRONZE
THE Simplest DESIGN

Buff & Buff Company
Jamaica Plain, Massachusetts

INSURE STRONGER PAVING
Reduce Water Content
with Carey Elastite
Subgrade Felt

Every Engineer knows that you can make concrete stronger by reducing the water content of the mix. You can use drier mixes if you waterproof earth subgrades with Carey Elastite Subgrade Felt before placing concrete. This is a strong, tough and inexpensive waterproof paper or felt which prevents absorption of water from the concrete into the Subgrade; makes complete separation between the concrete and Subgrade; makes sprinkling of the Subgrade unnecessary. Write for prices and details.
Handy pocket scale mailed on request. Address Dept. 81.

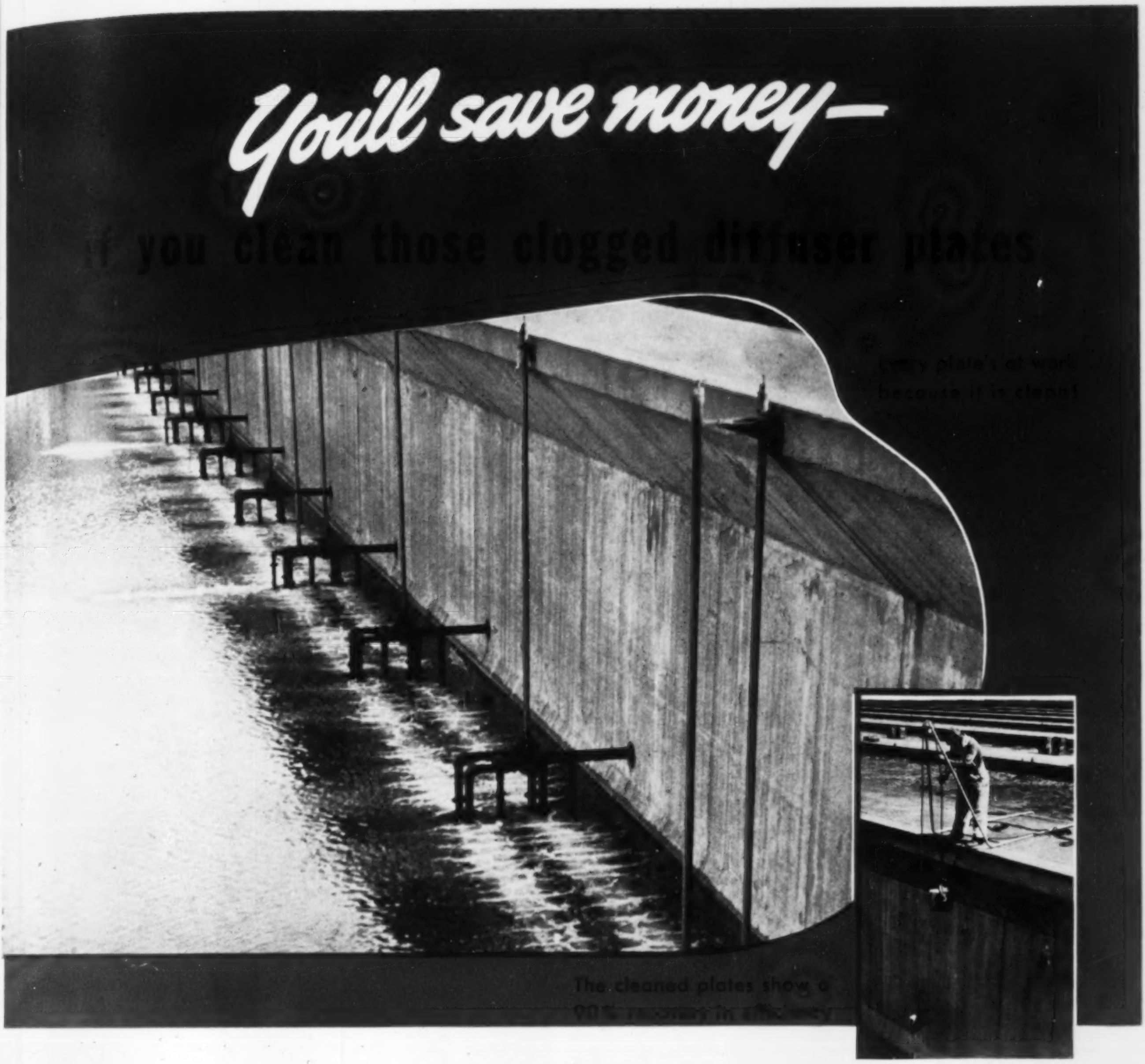
THE PHILIP CAREY MFG. COMPANY
Dependable Products Since 1873 Lockland, CINCINNATI, OHIO
In Canada: The Philip Carey Co., Ltd. Office and Factory: Lennoxville, P.Q.

INDEX TO ADVERTISERS

and their advertising agencies

AIR REDUCTION SALES COMPANY 8
G. M. Basford Company
ALUMINUM COMPANY OF AMERICA . *Third Cover*
Fuller & Smith & Ross, Inc.
AMERICAN PAULIN SYSTEM 20
ARMCO DRAINAGE PRODUCTS ASSOCIATION . . 11
BARRETT DIVISION, ALLIED CHEMICAL & DYE CORPORATION 17
McCann-Erickson, Inc.
BETHLEHEM STEEL COMPANY 13
BUFF & BUFF COMPANY 24
PHILIP CAREY MANUFACTURING COMPANY . . 24
S. C. Baer Company
CAST IRON PIPE RESEARCH ASSOCIATION . . *Back Cover*
Alley & Richards Company
DIXON'S *Typhonite* ELDORADO PENCILS . . . 15
Federal Advertising Agency
ELECTRO METALLURGICAL COMPANY 21
ENTERPRISE GALVANIZING COMPANY 20
R. E. Lovekin Corporation
INTERNATIONAL NICKEL COMPANY, INC. . . . 1
Marschalk & Pratt Company
IRVING SUBWAY GRATING CO., INC. 18
JOHNSON-MARCH CORPORATION 20
Alan B. Sanger
KEUFFEL & ESSER COMPANY . . . . . 2 and 14
Doremus & Company
LAYNE & BOWLER, INC. 16
O'Callaghan Advertising Agency, Inc.
LOCK JOINT PIPE COMPANY 4
Needham & Grohmann, Inc.
MACARTHUR CONCRETE PILE CORPORATION . 6
G. M. Basford Company
LOUIS MELIND COMPANY 23
Brandt Advertising Company
RAYMOND CONCRETE PILE COMPANY *Second Cover*
Needham & Grohmann, Inc.
SPENCER, WHITE & PRENTIS, INC. 18
TIMBER ENGINEERING COMPANY 3
Campbell-Ewald Company Inc.
UNION METAL MANUFACTURING COMPANY . 9
Griswold-Eshleman Company,
U. S. PIPE & FOUNDRY COMPANY 19
Alley & Richards Company

Index to Products Shown on Pages 22 and 23


You'll save money—
if you clean those clogged diffuser plates
Every plate's at work because it is clean!
The cleaned plates show a 90% recovery in efficiency

Power costs mount rapidly as diffuser plates in a sewage treatment plant get clogged. The air pressure required to keep aeration tanks going must be stepped up, so more and more power is used to drive the blowers.

It has been demonstrated* that it is economical to remove and clean diffuser plates when clogging of these plates has caused the blower discharge pressure to increase one-half pound per square inch.

Alcoa Aluminum diffuser plateholders of the Burger type are in service where these tests were run. These holders make it possible for plates to be removed for cleaning and replaced without breakage. Rubber gaskets make the plates water and airtight. Of course, these Aluminum plateholders are not now available—all metal is going to war products—but data like these disclosed here again prove that it is wise to include Aluminum holders in postwar planning.

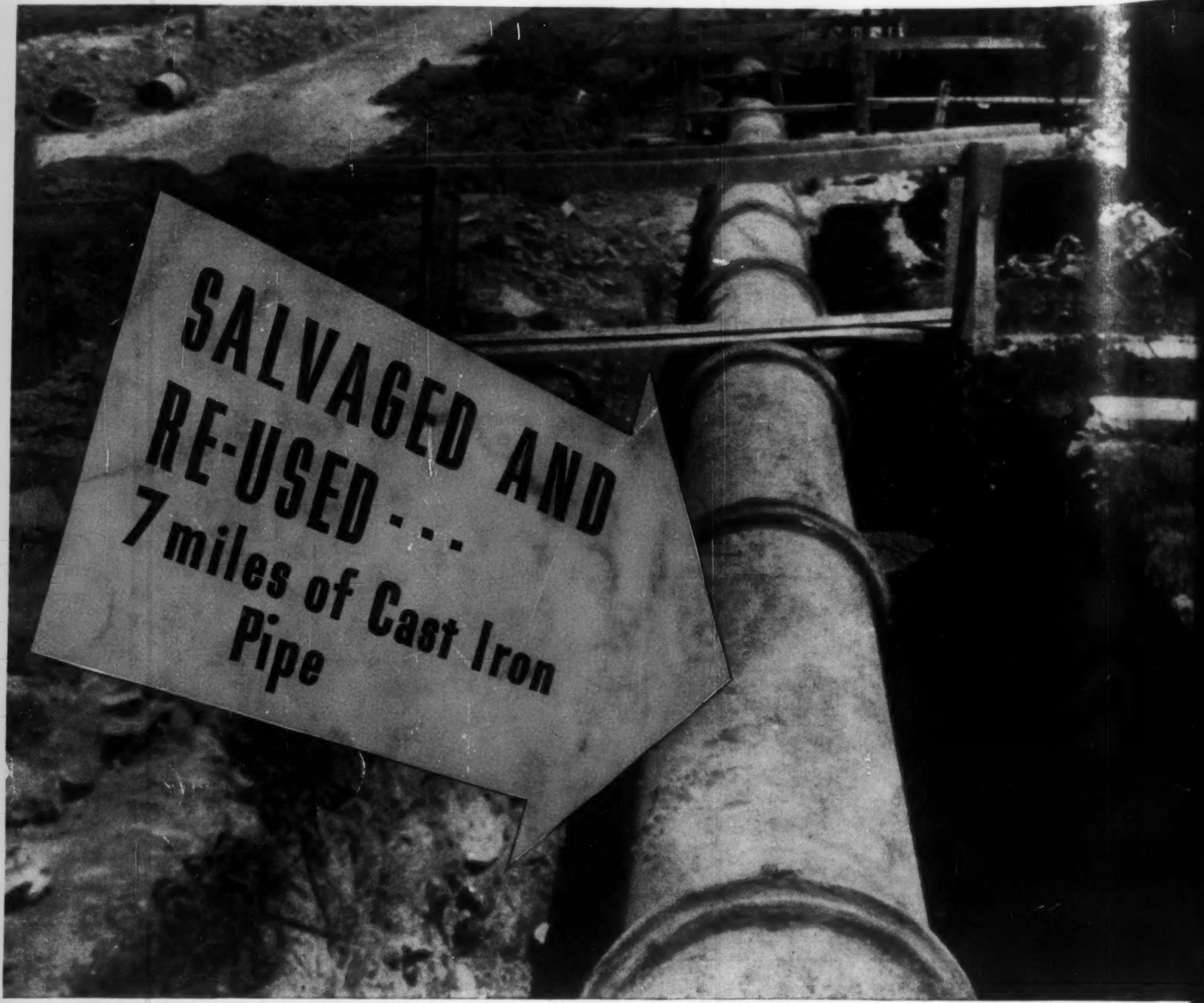
If you are interested in having a copy of the report on this study, we'll see that a copy is sent to you. Write ALUMINUM COMPANY OF AMERICA, 2127 Gulf Building, Pittsburgh, Pennsylvania.

• • •

**Reported in a paper by Willard F. Schade and John J. Wirts, presented at Ohio Conference on Sewage Treatment, Mansfield, Ohio, September 1941. Printed in Sewage Works Journal of January 1942.*

ALCOA ALUMINUM

REG. T. M.



Relocated 36-inch cast iron pipe at Readin

READING, PA. wanted the new highway even if it meant abandoning a seven-mile-long water main which had to be re-routed. The cost of a new cast iron line would have been approximately $350,000.

Fortunately, the original line was cast iron. It could be salvaged and re-used. It was. Seven miles of 30- to 40-year old cast iron pipe in 24-inch, 30-inch and 36-inch diameters were taken up, reconditioned and relocated. The taxpayers of thrifty Reading were thereby saved a large amount of money. This is a stri example of the salvage and re-use value of cast iron p But there are numerous other examples in the files of Cast Iron Pipe Research Association.

It is impossible to foretell future requirements or p lation shifts in metropolitan cities but any public off can be sure that, when water or sewer mains must be a doned or re-routed, the pipe can be salvaged or used, *if it is cast iron pipe.*

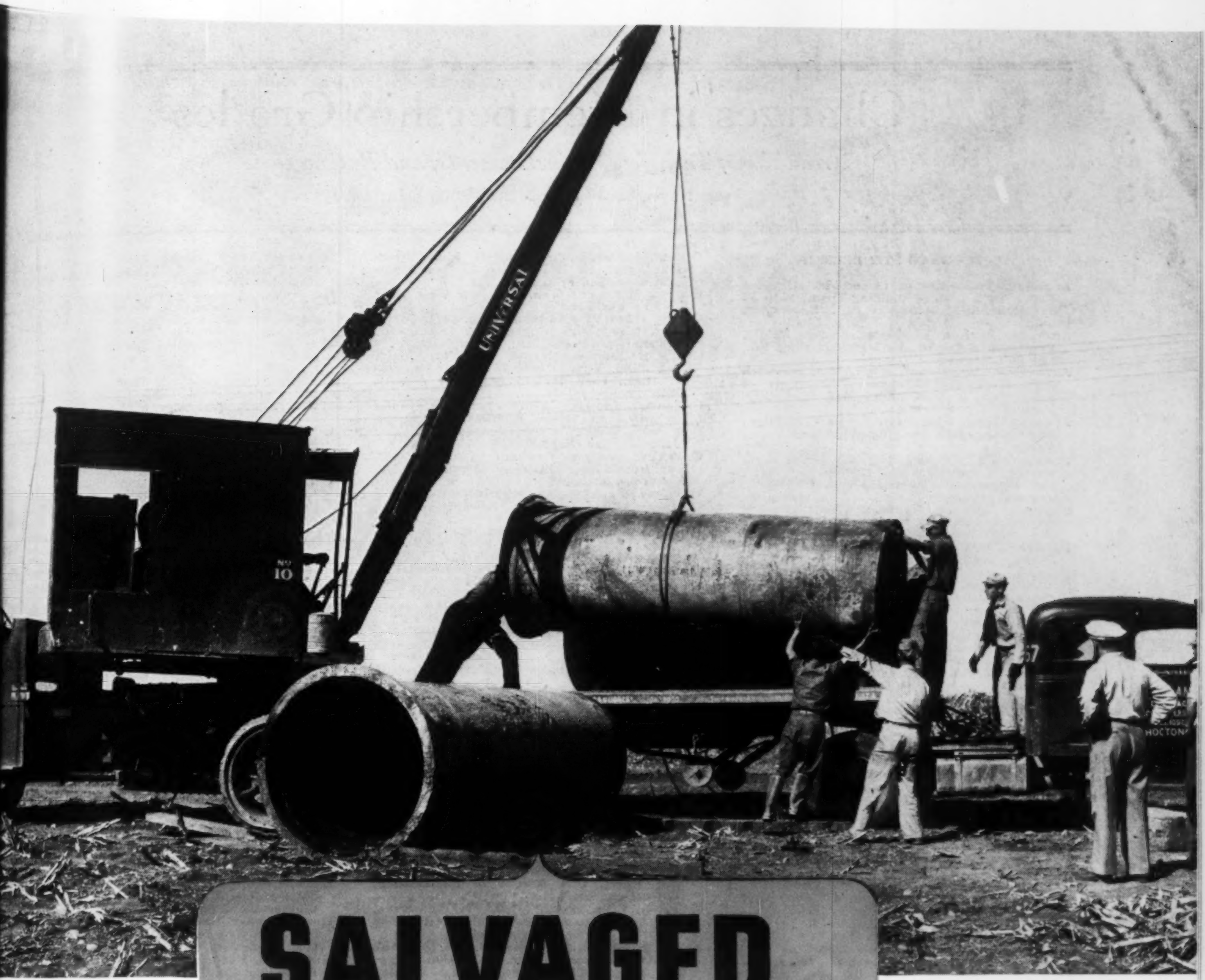
Pipe bearing this mark is cast iron pipe.

TRADE MARK REG

Available in diameters from 1¼ to 84 inches.

CAST IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1015 PEOPLES GAS BUILDING, CHICAGO, ILLI

CAST IRON PIP



SALVAGED...
for an extra dividend

Loading salvaged 48-inch cast iron pipe onto trucks at Columbus, Ohio. After 37 years' service, without any maintenance cost, this pipe was taken up and sold by the city for a substantial price per ton, over and above all removal expense.

Thirty-seven years ago the city officials of Columbus, o, authorized the construction of a cast iron sewer e main more than a mile long and 4 feet in diameter. e that time, 160 billion gallons had been pumped ugh this cast iron line without one cent of maintenance on the pipe.

Recently the city completed a new sewage treatment nt and large intercepting sewer, making the old n unnecessary for further duty. Since it was cast iron pipe, it was possible to salvage 1150 tons of material for either re-use or re-sale. The pipe was sold at a substantial price per ton, representing *an extra-dividend to the taxpayers* of Columbus.

It is impossible to foretell future requirements or population shifts in metropolitan cities but any public official can be sure that, when water or sewer mains must be abandoned or rerouted, the pipe can be salvaged or re-used, *if it is cast iron pipe.*

Pipe bearing this mark is cast iron pipe.

TRADE MARK REG.

Available in diameters from 1¼ to 84 inches.

IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1015 PEOPLES GAS BUILDING, CHICAGO, ILLINOIS

CAST IRON PIPE

PUBLIC TAX SAVER NO. 1

Changes in Membership Grades

Additions, Transfers, Reinstatements, and Resignations

From November 10 to December 9, 1941, Inclusive

Additions to Membership

Adamson, Paul Leslie (Assoc. M.'41), Res. Engr., Kern County Building Dept., 2510 M St. (Res., 218 Columbus St.), Bakersfield, Calif.

Akinaka, Arthur Yoshinori (Assoc. M.'41), Engr. and Surveyor, 1503 Houghtailing Rd., Honolulu, Hawaii.

Albertson, Maurice L. (Jun. '41), Research Asst., Hydraulics Laboratory, State Univ. of Iowa (Res., 13 East Burlington), Iowa City, Iowa.

Altman, Henry (Jun. '41), Junior Civ. Engr., Basic Magnesium, Inc., Box 1150, Las Vegas, Nev.

Barnett, Loren Merle (Jun. '41), Junior Highway Engr., State Div. of Highways, Dist. VIII, San Bernardino (Res., 295 Yucaipa Blvd., Yucaipa), Calif.

Barnwell, Joseph Brunson (Jun. '41), Lt. (jg), CEC, U.S.N.R., 128 Federal Court House (Res., 1033 West 6th St.), Erie, Pa.

Barrett, Edgar Lloyd (Jun. '41), Draftsman, The Texas Co. (Res., 3041 Proctor St.), Port Arthur, Tex.

Bauer, George Jackson (Jun. '41), 2908 Winchester St., Baltimore, Md.

Beedle, Lynn Simpson (Jun. '41), Ensign, U.S.N.R., Post Graduate School, U.S. Naval Academy, Annapolis, Md.

Beer, Robert Louis (Jun. '41), Supt., Arnold M. Diamond, 50 Court St., New York, N.Y.

Benassini Vizcaino, Aurelio (Assoc. M.'41), Civ. Engr., Mexican National Comm. of Irrig., Balderas 94, Mexico City, Mexico.

Bennion, Richard Ephraim (Jun. '41), With U.S. Engrs., 200 Post Office Bldg. (Res., 1820 H St.), Sacramento, Calif.

Benson, Earl Kenneth (Jun. '41), Eng. Aid, III, State Highway Dept., Stephen, Minn.

Berryhill, Richard Henry (Jun. '41), Junior Engr. (Hydr.), U.S. Engrs., 416 Wright Bldg. (Res., 910 West Admiral, Apt. D), Tulsa, Okla.

Birkel, Louis Ferdinand, Jr. (Jun. '41), Box 139, Cocoli, Canal Zone.

Bishop, John Reid (Jun. '41), Asst. Engr. Appraiser, Farm Credit Administration, 1501 Locust (Res., 4364 Lindell Blvd.), St. Louis, Mo.

Black, Norman Dean, Jr. (Jun. '41), Structural Detailer, Am. Bridge Co., Elmira, N.Y. (Res., 146 South Main St., North Wales, Pa.)

Brancaccio, Joseph Charles (Jun. '41), 2d Lt., Corps of Engrs., U.S. Army, Plattsburg Barracks (Res., 1554 Fifty-seventh St., Brooklyn), N.Y.

Brown, Harry Madara (M. '41), With J. E. Greiner Co., 1201 St. Paul St. (Res., 1001 St. Paul St.), Baltimore, Md.

Brown, Irving Lynn (Jun. '41), Junior Hydr. Engr., U.S. Geological Survey, 302 West 15th St., Austin, Tex.

Brown, Thane Edwin (Assoc. M. '41), Head Squad Engr., Foley Brothers-Walbridge-Aldinger Co., Twin Cities Ordnance Plant, St. Paul (Res., 2516 Harriet Ave., Minneapolis), Minn.

Brown, William Louis (Jun. '41), Junior Engr., U.S. Engr. Dept., 208 Post Office Bldg. (Res., 714 Eighteenth St.), Sacramento, Calif.

Browning, Rodger Edwin (Jun. '41), Insp., Weldon Springs Ordnance Works, Weldon Springs (Res., 5848 Cabanne Ave., St. Louis), Mo.

Burr, Kenneth Raymond (Assoc. M. '41), Associate Civ. Engr., Public Works Div., U.S.N., Puget Sound Navy Yard (Res., 2804 Nineteenth St.), Bremerton, Wash.

Byers, Edward Franklin (Jun. '41), 1270 East 142d St., East Cleveland, Ohio.

Campbell, Wallace Ross (Assoc. M. '41), With Black & Veatch, 4706 Broadway, Kansas City, Mo.

Capodieci, Bernard Ernest (Jun. '41), Insp., Constr., Public Works Dept., U.S.N., Navy Yard, Brooklyn, N.Y.

Carlson, Carl Arthur (Jun. '41), Box 587, Route 1, Fontana, Calif.

Carlson, Elner Wilfred (Assoc. M. '41), Hydrologic Supervisor, Weather Bureau Office, U.S. Dept. of Commerce, 725 Federal Bldg., Cincinnati, Ohio.

Carnes, George Knox (Jun. '41), 2d Lt., Corps of Engrs., U.S. Army, Ferris, Tex.

Cegelski, Joseph John (Jun. '41), Asst. Engr., Pascone Brothers, Inc., 73 Stueben St., Bridgeport (Res., 17 Daggett St., New Haven), Conn.

Cheatham, Fred Russell (Jun. '41), 1115 Ranier, Bremerton, Wash.

Childers, Garland Baxter (Jun. '41), 515 Santa Fe St., Augusta, Kans.

Collin, Alvaro Louis (Jun. '41), Junior Structural Engr., H. J. Brunnier, 55 New Montgomery St., San Francisco, Calif.

Contini, Roberto (Jun. '41), 503 West 121st St., New York, N.Y.

Corns, Charles Franklin (Jun. '41), Junior Engr. (Civ.), U.S. Engrs., War Dept., 1709 Jackson (Res., Y.M.C.A.), Omaha, Nebr.

Costales, Bernard Raoul (Jun. '41), Junior Engr., U.S. Engr. Dept., 751 South Figueroa St. (Res., 6518 Pollard St.), Los Angeles, Calif.

Crandall, Lionel LeRoy (Jun. '41), Junior Highway Engr., Div. of Highways, State Dept. of Public Works, 1365 Harbor St. (Res., 3993 Idaho St.), San Diego, Calif.

Crowley, Bernard Reuvelt (Assoc. M. '41), Res. Engr., State Highway Dept., Box 378, Mount Vernon, Tex.

Davidson, Frederic Armstrong, Jr. (Jun. '41), Ensign, A-V (S), U.S.N.R., Naval Reserve Air Base, Washington, D.C.

Dean, Olney Joseph, Jr. (Jun. '41), 309 North 7th, McAllen, Tex.

Dennison, John Taylor (Jun. '41), Asst. Engr. (Structural), U.S. Engrs., 410 Bennie Dillon Bldg. (Res., 1442 McAlpine), Nashville, Tenn.

DeWeese, Ralph W. (Assoc. M. '41), Asst. Engr., U.S. Bureau of Reclamation, Dept. of Interior, Box 218, St. George, Utah.

Dierker, Fred Herman (Jun. '41), Junior Engr., East Bay Municipal Utility Dist., 512 Sixteenth St., Oakland, Calif.

Dieth, Charles Herman (Jun. '41), Draftsman, Gardner & Howe, 2534 Palmer Ave., New Orleans, La.

Dresser, Herman Garland (M. '41), Engr., Samuel M. Ellsworth, 12 Pearl St., Boston (Res., 56 Cordis St., Wakefield), Mass.

Duggan, Howard William (M.'41), Chf. Engr., Stebbins Eng. & Mfg. Co., 363 Eastern Blvd., Watertown, N.Y.

Eckerlin, Howard Frederick (Jun. '41), Structural Draftsman, Eng. Dept., The Solvay Process Co., Syracuse, N.Y.

Eckman, Robert Wirt (Jun. '41), Junior Draftsman, E. I. du Pont de Nemours & Co., Inc., Nemours Bldg. (Res., 1519 Franklin St.), Wilmington, Del.

Ehrenhard, Philip Erwen (Assoc. M. '41), Asst. Engr., U.S. Bureau of Reclamation, Coulee Dam, Wash.

Erskine, Paul Baker (Jun. '41), Foreman, Griffith Co., Los Angeles Ry. Bldg. (Res., 648 West 18th St.), Los Angeles, Calif.

Evans, Jesse William (Assoc. M. '41), Eng. Aid, Los Angeles County Engr., 700 Union League Bldg. (Res., 1942 West 68th St.), Los Angeles, Calif.

Feldman, Milton Maurice (Jun. '41), 1852 Forty-ninth St., Brooklyn, N.Y.

Feldscher, Carl Burandt (Jun. '41), Junior Engr., U.S. Lake Survey, 649 Federal Bldg. (Res., 1742 Parker Ave.), Detroit, Mich.

Foley, James Lennon, Jr. (Jun. '41), Junior Eng. Aid, Traffic Eng. Bureau, Police Headquarters, Detroit, Mich.

Franklin, Robert Evans (Jun. '41), Junior Hydroelectric Engr., U.S. Engr. Office, 751 South Figueroa St. (Res., 705$^1/_2$ West 35th Pl.), Los Angeles, Calif.

Garretson, Bradley Burnett (Jun. '41), Junior Engr., SCS, U.S. Dept. of Agriculture, San Fernando (Res., 4119 Manila Ave., Oakland), Calif.

Gear, Harry Compton (Assoc. M. '41), Asst. Engr., Lone Star Gas Co., 1915 Wood St. (Res., 3821 Stanford), Dallas, Tex.

TOTAL MEMBERSHIP AS OF DECEMBER 9, 1941

Members	5,738
Associate Members	6,790
Corporate Members	12,528
Honorary Members	37
Juniors	4,749
Affiliates	68
Fellows	1
Total	17,383

Germano, Frank James (Assoc. M. '41), Asst. Prof., Eng. Mechanics, Louisiana State Univ. Eng. Hall, University, La.

Gerstner, Merrill Anthony (Assoc. M. '41), Asst. Engr., Barnard, Godet & Heft, 314 Terminal Station (Res., 1937 Touro St.), New Orleans, La.

Gifford, Jack Brennan (Jun. '41), Aviation Cadet, U.S.N.R., Naval Air Station, Jacksonville, Fla.

Godbold, Ferd Sessions, II (Jun. '41), Junior Civ. Engr., Humble Oil & Refining Co., 1405 Canal Bank Bldg. (Res., 4501 South Derbigny St.), New Orleans, La,

Gould, William Francis (M. '41), Advisory Engr., Pennsylvania Turnpike Comm., 11 North 4th St., Harrisburg (Res., 2300 Yale Ave., Camp Hill), Pa.

Greenwood, George Hamilton (Assoc. M. '41), Lt. (jg), CEC, U.S.N.R., Planning Officer, Public Works Office, 16th Naval Dist., Navy Yard, Philippine Islands.

Groesbeck, Stewart Winn (Jun. '41), Junior Highway Engr., State Div. of Highways, 50 Higuera, San Luis Obispo, Calif. (Res., 534 Ninth, Klamath Falls, Ore.)

Gruttadauria, James Vincent (Jun. '41), Junior Engr., U.S. Engrs., Wright Field, Dayton, Ohio.

Haag, Roger Richard (Jun. '41), With E. I. du Pont de Nemours, Inc., 2615 Independence Rd. (Res., 7407 Camden Ave.), Cleveland, Ohio.

Hale, Malcolm David (Jun. '41), Junior Hydr. Engr., U.S. Geological Survey, 302 West 15th St. (Res., 2507 Red River St.), Austin, Tex.

Harnish, Charles Fairchild (M. '41), Senior Engr., William S. Lozier, Inc., 10 Gibbs St., Rochester, N.Y.

Harris, Robert Olin (Assoc. M. '41), Acting State Safety Consultant, WPA, 10 Forsyth St. Bldg. (Res., 760 Piedmont Ave., N.E.), Atlanta, Ga.

Hink, Clement Warren (Jun. '41), Junior Soil Conservationist (Engr.), SCS, U.S. Dept. of Agriculture, 660 Seventeenth St. (Res., 1129 I St.), Merced, Calif.

Hochlerner, Tobias (M. '41), Acting Chf. Engr., Bureau of Water Supplv, Dept. Water Supply, Gas and Electricity, City of New York, 2456 Municipal Bldg., New York, N.Y.

Holm, Carl (Jun. '41), Asst. Engr., Associated Shipbuilders, 2727 Sixteenth, S.W. (Res., 8529 Eighteenth, N.W.), Seattle, Wash.

Holt, Robert Earl (Jun. '41), Junior Engr., SCS, 416 West 5th St. (Res., 822 North Parton), Santa Ana, Calif.

Hornkohl, Fred (M. '41), Coordinator, Fraser Brace Eng. Co., Inc., Weldon Spring Ordnance Works, Weldon Spring, Mo.

Horton, Ralph McKinley, Jr. (Jun. '41), Senior Technician, State Planning Board, 100 Calhoun State Office Bldg. (Res., 2732 Blossom St.), Columbia, S.C.

Hu, Pai Chuan (Jun. '41), With Giffels & Vallet, 1000 Marquette Bldg. (Res., Y.M.C.A.), Detroit, Mich.

Hunsicker, John David (Jun. '41), Junior Engr., New York Water Service Corp., 90 Broad St., New York, N.Y. (Res., 250 Market St., Perkasie, Pa.)

Hunt, Thomas David (Jun. '41), Junior Engr., U.S. Engrs., 1820 H St., Sacramento, Calif.

Hunter, William Frederick (M. '41), Senior Bridge Designer, State Highway Dept., State House Annex (Res., 2 Abernethy Drive), Trenton, N.J.

Johnson, Donald Charles (Assoc. M. '41), Asst. Regional Engr., SCS, U.S. Dept. of Agriculture, 2223 Fulton St. (Res., 70 Forest Lane), Berkeley, Calif.

Johnson, Ennis Esten, Jr. (Jun. '41), Apprentice Engr., Phillips Petroleum Co., Box 6666, Odessa, Tex.

Johnson, Oscar Lloyd (Jun. '41), Draftsman, Howard, Needles, Tammen & Bergendoff, Southwestern Proving Grounds (Res., 604 South Hamilton St.), Hope, Ark.

Karp, Milton Alfred (Jun. '41), Prin. Eng. Draftsman, Planning Div., Navy Yard, Brooklyn (Res., 1888 Crotona Parkway, New York), N.Y.

Keasey, Richard Alden (Jun. '41), Asst. Chf., Constr. Section, Headquarters, ODE, Philippine Dept., U.S. Army, Manila, Philippine Islands.

Kelley, Walter Bernard (Jun. '41), 88 East Cottage St., Dorchester, Mass.

Kershner, Lloyd Franklin, Jr. (Jun. '41), Draftsman, Newport News Shipbuilding & Dry Dock Co., 98 Thirty-fourth St., Newport News, Va. (Res., 1 East Brown St., Norristown, Pa.)

Kester, Harold Osborn (Jun. '41), Buffalo, Wyo.

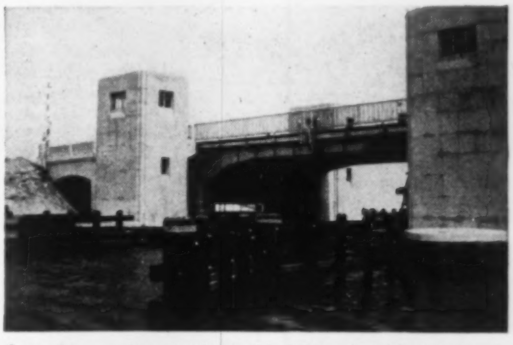
Don't Paint ANOTHER STRUCTURE UNTIL IT HAS BEEN PROPERLY RECONDITIONED BY AIRCO Flame Cleaning

These instructions might well come from the "brass hats" in any number of contracting firms. For, the executives of many such companies have already solved their metal painting problems by preparing surfaces with the Airco Flame Cleaning Process before repainting. And wise advice this would be, because this economical process is the most effective method yet devised to prepare metal surfaces for long lasting paint jobs.

Utilizing a high temperature flame, Airco Flame Cleaning removes rust and scale, and dehydrates as it cleans; it leaves the metal surface dry and warm, conducive to a lasting paint job. This process is highly flexible, size or shape of the object to be cleaned make no difference. The apparatus with which it is applied is light, standard, portable and easy to operate.

Members of Air Reduction's Applied Engineering Department are available to assist in the proper application of the process so that it will be most effective wherever used. Further information will be gladly given upon request.

Rust conditions such as this are common—yet paint which will protect against corrosion cannot last long when applied to the surface in its present condition.



Spanning a salt water inlet, this bridge is subject to harsh exposure. Because it was flame cleaned prior to repainting, the present paint job will outlast its first many times.

Air Reduction

General Offices: 60 EAST 42nd ST., NEW YORK, N. Y.

IN TEXAS
MAGNOLIA-AIRCO GAS PRODUCTS CO.
AIRCO DISTRICT OFFICES IN PRINCIPAL CITIES

AIRCO WILSON

Anything and Everything for GAS WELDING or CUTTING and ARC WELDING

Key, Otis Nathaniel (Assoc. M. '41), Associate Engr. and Supt. of Constr., War Dept. (Res., 314 East Rio Grande Ave.), Victoria, Tex.

Knight, Winfield Baker (Jun. '41), With U.S. Army, 6 Everett St., Taunton, Mass.

Knoop, Frederick Rippel, Jr. (Jun. '41), Lt., U.S. Army, Fort Belvoir, Va. (Res., 700 Glen Allen Drive, Baltimore, Md.)

Koulas, William Gus (Jun. '41), Computer, Planning Survey, State Highway Dept., Lensic Bldg., Santa Fe (Res., 611 North 15th St., Albuquerque), N.Mex.

Kroening, Henry Frank (Jun. '41), Junior Hydr. Engr., U.S. Geological Survey, 14 Post Office Annex, Urbana (Res., 510 East Healey St., Champaign), Ill.

Kroll, Charles Leslie (Assoc. M. '41), Field Engr., B.&O. R.R., B.&O. Annex Bldg., Baltimore, Md.

Leinbach, David Singleton (Jun. '41), Junior Engr., U.S. Engr. Dept., 409 Davidson Bldg., Kansas City, Mo.

Levitt, Edward Tobins (Assoc. M. '41), Lt. (jg), CEC, V (S), U.S.N.R., Naval Mobile Base Hospital 2, Pearl Harbor, Hawaii.

Li, Zen Jung (Jun. '41), Detailer, Giffels & Vallet, Inc., 243 West Congress St., Detroit, Mich.

Lockwood, Mason Graves (M. '41), (Lockwood & Andrews), 904 Union National Bank Bldg., Houston, Tex.

Lubsen, Rudolph John (Assoc. M. '41), Instr., Iowa State College, 201 Laboratory of Mechanics (Res., 521 Stanton Ave.), Ames, Iowa.

McCord, Kenneth Armstrong (Jun. '41), With Whitman, Requardt & Smith, 1304 St. Paul St. (Res., 3906 Cottage Ave.), Baltimore, Md.

McCune, Robert Francis (Affiliate '41), Gen. Supt., W. E. Callahan Constr. Co., 2034 Amelia St., Dallas, Tex.

McGuinness, William James (Assoc. M. '41), Instr., Dept. of Architecture, Pratt Inst., 215 Ryerson St., Brooklyn, N.Y.

McMullin, Floyd Hopkins (Jun. '41), Junior Engr., U.S. Bureau of Reclamation, Courthouse, Santa Barbara, Calif.

McNear, Robert Barton (Assoc. M. '41), With International Filter Co., 325 West 25th Pl., Chicago (Res., 599 Berkley Ave., Elmhurst), Ill.

McNeill, John Levis (Jun. '41), 1328 Corona St., Denver, Colo.

Machis, Alfred (Jun. '41), 867 Hollins St., Baltimore, Md.

Mass, Marvin Leon (Jun. '41), Engr., Boeing Aircraft Co. (Res., 4710 University Way), Seattle, Wash.

Mataraci, Hason Ilyas (Jun. '41), 32 Mellen St., Cambridge, Mass.

Mathias, William Joseph Maxwell (Jun. '41), Designing Draftsman, Lukens Steel Co., Coatesville, Pa. (Res., 36 Frost Ave., Frostburg, Md.)

Meek, Thomas Harris (M. '41), Job Engr., Carbide & Carbon Chemical Corp., South Charleston, W.Va.

Micklewright, William Henry (Assoc. M. '41), Designer, Phelps-Dodge Corp., 25 Broadway, New York, N.Y. (Res., 164 Mortimer Ave., Rutherford, N.J.)

Miller, Robert Boyd (Jun. '41), Dist. Engr., SCS, I.O.O.F. Bldg. (Res., 221 East Broadway), Montesano, Wash.

Modisett, Shirley Augustus (Jun. '41), With E. I. du Pont de Nemours & Co., Camp Ground Rd. (Res., 1362 South 3d St.), Louisville, Ky.

Moffet, Clifford Everett (Jun. '41), Junior Engr., Standard Oil Co. of California, 225 Bush St. (Res., 835 Hyde St.), San Francisco, Calif.

Norris, Walter Thomas (Assoc. M. '41), Dist. Engr., Am. Inst. of Steel Constr., Sharon Bldg., San Francisco, Calif.

Novaro, Joseph Angelo (Assoc. M. '41), 1st. Lt., Corps of Engrs., U.S. Army, U.S. Engr. Office, Box 3829, San Juan, Puerto Rico.

Nuckolls, Charles Robert (Jun. '41), 2319 East 4th Pl., Tulsa, Okla.

Odom, Harold Lester (Jun. '41), 2d Lt., U.S.-M.C.R., 6th Reserve Officers Corps, Quantico, Va.

Olivari, Louis (Jun. '41), Junior Naval Archt., U.S.N., Navy Yard, Philadelphia, Pa. (Res., 127–03 Ninety-seventh Ave., Richmond Hill, N.Y.)

Ory, Francis Joseph (Jun. '41), Junior Engr. (Civ.), U.S. Engr. Office, Ft. of Prytania St. (Res., 312 Millandon St.), New Orleans, La.

Owen, John Walker (Jun. '41), Junior Engr., Turner Constr. Co., Graybar Bldg., New York, N.Y. (Res., Central Y.M.C.A., Philadelphia, Pa.)

Painter, Stephen Wallace, Jr. (Jun. '41), Junior Engr., Muscoda Ore Mines and Quarries Div., Eng. Dept., Tennessee Coal, Iron & R.R. (Res., 1620$^1/_2$ Arlington Ave.), Bessemer, Ala.

Parker, John Stanley (Assoc. M. '41), Field Engr., Pacific Gas & Elec. Co., 245 Market St., San Francisco (Res., Montgomery Creek), Calif.

Patev, Nikola Carl Gustaf (Jun. '41), Naval Archt. (Eng. Aide), U.S.N., Boston Navy Yard, Charlestown (Res., 152 Nilsson St., Brockton), Mass.

Pavlo, Alexander Leo (Assoc. M. '41), Designing Engr., Holabird & Root-Moran, Proctor, Freeman & Mueser, 155 East 44th St., New York (Res., 2330 East 21st St., Brooklyn), N.Y.

Peters, Reinhardt Edward (Jun. '41), Asst. Engr., U.S. Engr. Office, Norfolk, Va.

Petersen, Carroll Clayton (Jun. '41), With Am. Bridge Co. (Res., 563 Garfield), Gary, Ind.

Peterson, Paul Robert (Jun. '41), Structural Detailer, Am. Bridge Co., Ft. of Warren St. (Res., 489 West State St.), Trenton, N.J.

Phillipich, Anthony Raymond (Jun. '41), With State Highway Dept. (Res., 217 West St. Joseph St.), Lansing, Mich.

Phillips, Arthur Bradfield (Assoc. M. '41), Associate Civ. Engr., U.S. Coast Guard (Res., 616 Regester Ave.), Curtis Bay, Md.

Phillips, Douglas Wise (Jun. '41), 248 Academy St., Trenton, N.J.

Phillips, Gordon Albert (Jun. '41), Ensign A-V (S), U.S.N.R., Naval Air Station, Sitka, Alaska.

Pollock, Robert Deforest (Jun. '41), Junior Engr., U.S. Engrs., Box 326 (Res., 130 South Vine St.), Harrisburg, Ill.

Pruit, John Andie (Assoc. M. '41), (French & Pruit Co.), Box 1127, Abilene, Tex.

Richards, Neil Purnell (Jun. '41), 105 Valentine Pl., Ithaca, N.Y.

Richardson, Donald Whitney (Assoc. M. '41), Chf. Engr., Wigton Abbott Corp., Plainfield, N.J. (Res., 32 Sherman Ave., Glens Falls, N.Y.)

Rieth, William Nicholas (Jun. '41), Junior Engr., U.S. Engrs., R.R. 3, Goshen, Ind.

Rizzi, Charles Alfred (Assoc. M. '41), Vice-Pres., R. E. Carrick Co., 420 Madison Ave., New York (Res., 13 Wakefield Rd., Scarsdale), N.Y.

Rostron, James Thomas (Jun. '41), Junior Civ. Engr., SCS, 414 West 5th, Santa Ana (Res., 38 North San Marino Ave., Pasadena), Calif.

Rothermel, Glen Urban (Jun. '41), 237 Chapman Pl., Elmira, N.Y.

Rouse, Harold Douglas (Assoc. M. '41), Asst. Engr., Walsh-Driscoll Co., Army Post Office 803, Port of Spain, Trinidad.

Salomon, Jerome Leonard (Jun. '41), Junior Civ. Engr., U.S. Engrs., 208 Post Office Bldg., Sacramento (Res., 320 Seville Way, San Mateo), Calif.

Sampson, Albert Kenneth (Assoc. M. '41), Planning Engr., Regional Planning Comm., 205 South Broadway, Los Angeles (Res., 250 Amalfi Drive, Santa Monica), Calif.

Sarayliоglu, Yani (Jun. '41), With Structural Eng. Dept., Giffels & Vallet, Inc., 1000 Marquette Bldg. (Res., Y.M.C.A., Downtown Branch), Detroit, Mich.

Savastio, James Dominic (Assoc. M. '41), Engr., Tilghman Moyer Co., 141 North 9th St., Allentown, Pa.

Scanlan, Melvin Eugene (Jun. '41), Junior Engr., Div. of Water Resources, U.S. Dept. of Agriculture, Court House, Garden City, Kans.

Schmidt, Ernest Leo (Jun. '41), Vice-Pres., Leo W. Schmidt, Inc., 1000 Granger Rd., Cleveland, Ohio.

Schmitter, Bernard Millard (Jun. '41), 42 Grant St., Fairview, N.J.

Seaver, John Whitney (Jun. '41), Cadet Engr., Ebasco Services, Inc., 2 Rector St., New York (Res., 214–45 Twenty-ninth Ave., Bayside), N.Y.

Shawver, Guy Ernest (Jun. '41), 4356 Pennsylvania St., Gary, Ind.

Skidmore, Wallace Elbert (Jun. '41), Junior Engr., U.S. Bureau of Reclamation, Dept. of Interior, Redding, Calif.

Slattery, Fremont W., Jr. (Jun. '41), 1309 Farrell Ave., Vallejo, Calif.

Smith, Richard Parker (Jun. '41), Lt., U.S. Army, Fort Rodman, New Bedford, Mass.

Sons, Charles Carol, Jr. (Jun. '41), With Curtiss Propeller Div., Caldwell, N.J.

Steinbrugge, Karl Vathauer (Jun. '41), Draftsman and Computer, C. C. Kennedy, Atlas Bldg., San Francisco, Calif. (Res., 7114 South East 17th, Portland, Ore.)

Stickel, Richard Elwin (Jun. '41), Junior Civ. Engr., U.S. Forest Service, 760 Market St., San Francisco, Calif.

Stisulis, Walter Lewis (Jun. '41), Eng. Aide, Grade 2, State Highway Comm., State St., Augusta (Res., 4 Halifax St., Winslow), Me.

Swanson, Kenneth Carl (Assoc. M. '41), Structural Engr., Buffalo Niagara Elec. Corp., 300 Electric Bldg., Buffalo (Res., 47 Drullard Ave., Lancaster), N.Y.

Thwing, William Harold (Jun. '41), Associate Engr., Parker & Hili, 2021 Smith Tower, Seattle, Wash.

Tindal, Levy Rhame (Jun. '41), Senior Structural Draftsman, National Advisory Committee for Aeronautics, Langley Field, Va. (Res., 1330 A St., S.E., Washington, D.C.)

Tolton, William Russell (Jun. '41), Junior Engr., Investigations Div., U.S. Engrs., 208 New Post Office Bldg. Sacramento (Res., 4635 California St., San Francisco), Calif.

Van Arsdale, Harold Charles (Jun. '41), Ensign (SC), U.S.N., Hamilton C-22, Soldiers Field, Mass. (Res., 919 West Front St., Plainfield, N.J.)

Walker, Samuel Austin, Jr. (Assoc. M. '41), Designer, Rust Eng. Co., Clark Bldg., Pittsburgh, Pa.

Wallace, John Randall, Jr. (Jun. '41), Associate Instr., Gen. Eng., Univ. of Washington (Res., 557 East 102d St.), Seattle, Wash.

Ward, Jack Warren (Jun. '41), 2d Lt., 32d Infantry, U.S. Army, Fort Ord, Calif. (Res., 221 North Polk St., Moscow, Idaho.)

Wells, Codie Dean (M. '41), (Beavers, Lodal & Wells), 1411 Smith Young Tower, San Antonio, Tex.

West, Joseph Edward (Jun. '41), Junior Engr., U.S. Bureau of Reclamation, 404 Custom House, Denver, Colo.

Whalen, Arthur (Jun. '41), With F. H. McGraw & Co., U.S. Submarine Base (Res., Crocker House, State St.), New London, Conn.

Wilson, Walter Thiell (Assoc. M. '41), Asst. Hydrologic Engr., Weather Bureau, Washington, D.C.

Wirt, Robert Louis (Assoc. M. '41), Structural Engr., Buffalo Niagara Elec. Corp., 300 Elec. Bldg., Buffalo (Res., 18 Cayuga Ave., Lancaster), N.Y.

Wishart, John Russell, Jr. (Jun. '41), With A. Wishart & Sons, Co., 172 Silver St., Sharon, Pa.

Wolfsheimer, Frank (Jun. '41), Ensign, CEC, U.S.N.R., Naval Station, Guam, Guam.

Wolkonowicz, John Michael (Jun. '41), Benjamin Rd., Shirley, Mass.

Woodruff, Seth Ritch, Jr. (Assoc. M. '41), Senior Engr., Special Eng. Div., The Panama Canal, Diablo Heights, Canal Zone.

Wright, Otis Alner (Jun. '41), Shop Liaison Engr., Lockheed Aircraft Corp. (Res., 1722 North Brighton St.), Burbank, Calif.

Yates, Francis Gordon (Jun. '41), Junior Civ. Engr., U.S. Engrs., War Dept., Young Hotel Bldg., Honolulu, Hawaii.

York, James Albert (Jun. '41), Liberty, Nebr.

Young, Lyle Eugene (Jun. '41), Engr., P.R.R., Federal St. Station, Pittsburgh (Res., 919 California Ave., Avalon), Pa.

Young, Pao-Chong (Jun. '41), With Gabriel Steel Co., 13700 Sherwood, Detroit, Mich.

Zidel, Mischel (Jun. '41), Junior Engr., U.S. Bureau of Reclamation, Redding, Calif.

Zimmerman, Abe (Assoc. M. '41), Field Engr., National Youth Administration for Indiana, 415 Century Bldg. (Res., 2906 Washington Blvd.), Indianapolis, Ind.

Zitek, Emil Stephen (Jun. '41), Engr. and Draftsman, Layne & Bowler, Inc., Box 186, Hollywood Station (Res., 943 Decatur St.), Memphis, Tenn.

Membership Transfers

Aalto, Johan August (Jun. '34; Assoc. M. '41), Asst. Engr., Office of the Comptroller, City of New York, 631 Municipal Bldg., New York, N.Y.

Akans, James Ernest (Jun. '36; Assoc. M. '41), Prin. Eng. Aide, TVA, Chattanooga, Tenn.

Barnett, Francis Victor (Jun. '32; Assoc. M. '41), Dist. Engr., United Gas Pipeline Co., Box 1422, Monroe, La.

Brooks, Jack Dickerson (Jun. '38; Assoc. M. '41), Asst. Engr. (Structural), U.S. Engr. Office, 751 South Figueroa St., Los Angeles (Res., 2912 Terrace Ave., Alhambra), Calif.

Bruce, John Frederick (Jun. '35; Assoc. M. '41), Asst. Engr., U.S. Army Engrs., 628 Pittock Block (Res., 3397 North East Fremont), Portland, Ore.

Cress, Eldred Everett (Assoc. M. '25; M. '41), Asst. Engr. of Tests, Assn. of Am. R.R., 59 East Van Buren St., Chicago, Ill.

Cultice, James Marvin (Jun. '37; Assoc. M. '41), Asst. Engr., Aerial Photographic Laboratory, Agri., Adjustment Administration, U.S. Dept. of Agriculture, Old Post Office Bldg., Washington, D.C. (Res., The Andrew Jackson, Apt. C-11, Alexandria, Va.)

Demboski, Henry (Jun. '35; Assoc. M. '41), Asst. Hydr. Engr., TVA, Box 918, Huntsville, Ala.

Dill, Frederick Hayes (Jun. '27; Assoc. M. '38; M. '41), Welding Engr., Am. Bridge Co., Ambridge (Res., 404 Maple Lane, Edgeworth, Sewickley), Pa.

Dorner, William John (Jun. '36; Assoc. M. '41), 1st Lt., Company D, 116th Engrs., U.S. Army, Army Post Office 41, Tacoma, Wash. (Res., 1336 South East 48th Ave., Portland, Ore.)

Ebur, Clifford Wheaton, Jr. (Jun. '37; Assoc. M. '41), Senior Draftsman, U.S. Engrs., Chamber of Commerce Bldg. (Res., 175 Grasmere St.), Pittsburgh, 5, Pa.

Engler, Leslie Winfred (Jun. '36; Assoc. M. '41), Instr., Civ. Eng. Dept., College of the City of New York, 139th St. and Convent Ave., New York, N.Y.

Ferguson, Randon (Assoc. M. '28; M. '41), Asst. Engr., Assn. Am. R.R., 59 East Van Buren, Room 1015, Chicago, Ill.

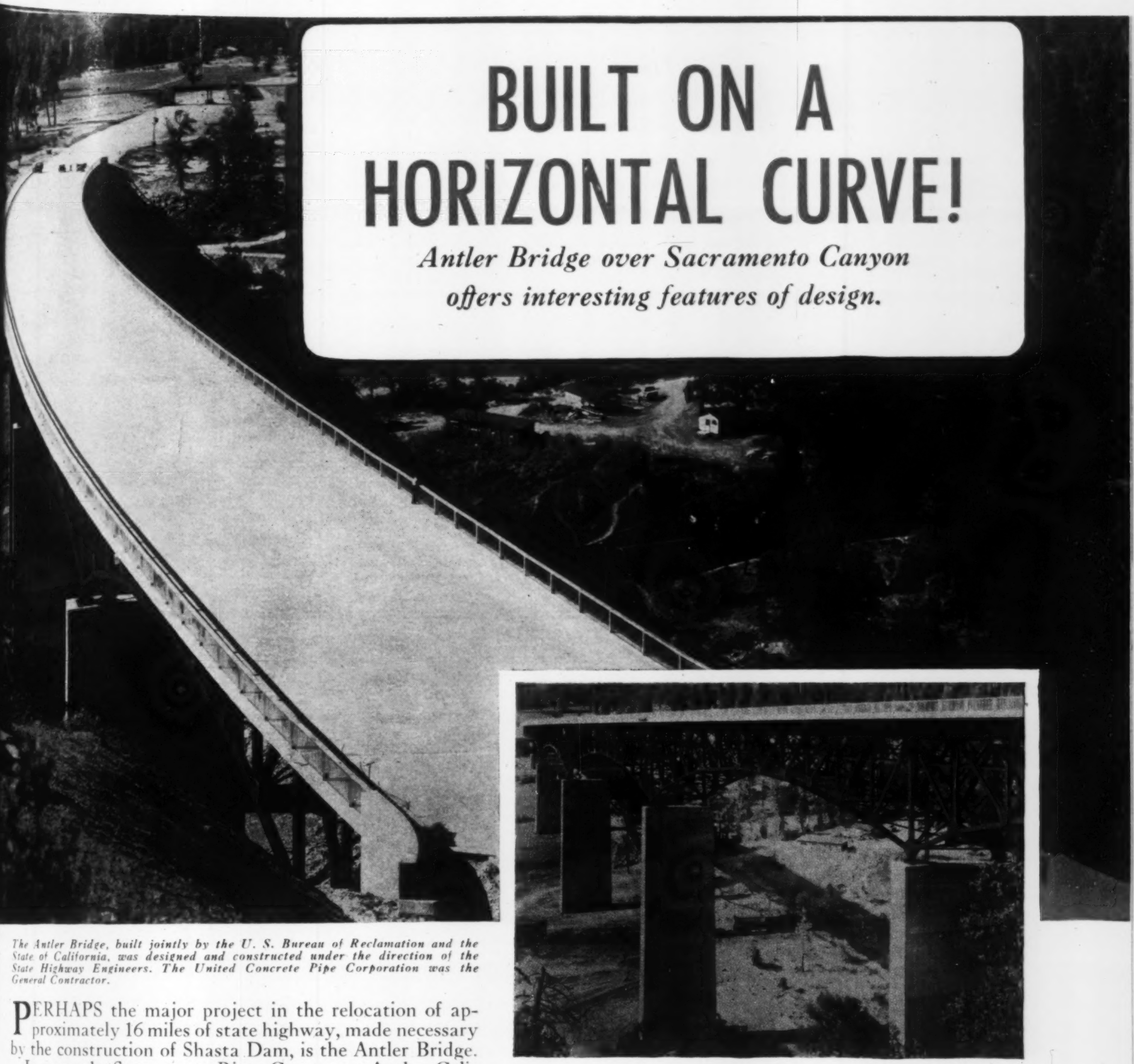
Fritz, Herbert Daniel (Jun. '30; Assoc. M. '41), Associate Engr., Const. Quartermaster, War Dept., 14th and Farnam, Omaha, Nebr. (Res., 3114 Sunnyside Ave., Burlington, Iowa.)

Gambrell, James Wyatt (Jun. '35; Assoc. M. '41), Asst. Hydr. Engr., U.S. Geological Survey, 220 Post Office Bldg., Asheville, N.C.

Gaylord, Charles Nelson (Jun. '35; Assoc. M.

BUILT ON A HORIZONTAL CURVE!

Antler Bridge over Sacramento Canyon offers interesting features of design.



The Antler Bridge, built jointly by the U. S. Bureau of Reclamation and the State of California, was designed and constructed under the direction of the State Highway Engineers. The United Concrete Pipe Corporation was the General Contractor.

PERHAPS the major project in the relocation of approximately 16 miles of state highway, made necessary by the construction of Shasta Dam, is the Antler Bridge.

It spans the Sacramento River Canyon, at Antler, California, some 18 miles above the site of Shasta Dam.

This is an impressive 1330-foot deck structure carrying a 50-foot, 4-lane concrete roadway flanked by 2½-foot sidewalks. The roadway is built on a vertical grade descending northwardly. It sweeps across the canyon on a horizontal curve of 850-foot radius. Its lines are pleasingly symmetrical.

Of the six supporting concrete piers, the tallest rises 172 feet above its footing. The highest point of the roadway deck is some 210 feet above the low water of the Sacramento. However, upon the completion of Shasta Dam, the backed-up waters will come to within 80 feet of the highest point—practically leveling-off with the tops of the piers at the low end of the structure.

ROADWAY VIEW AND ELEVATION OF THE ANTLER BRIDGE. The impounded waters of Shasta Dam eventually will rise to the approximate level of the concrete pier-tops, inundating the Sacramento river valley.

The steel superstructure, excepting for short beam approach spans at either end, is a symmetrical arrangement of 5 truss spans: two of 189 ft., two of 252 ft., and a central span of 273 ft. The 189-ft. and 252-ft. spans are grouped into two continuous units. Each unit cantilevers 63 feet beyond the central piers to support the 147-ft. suspended truss of the 273-ft. central span; also cantilevers 42 feet beyond the end piers to carry the beam span approaches. Of unusual interest is the truss design which utilized throughout CB Sections for component members—replacing the conventional laced and plated assemblies.

American Bridge Company, as sub-contractor to Columbia Steel Company, fabricated and erected the approximately 1700 tons of steel which entered into this construction.

AMERICAN BRIDGE COMPANY

General Offices: **Frick Building, Pittsburgh, Pa.**

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit · Duluth
Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

'41), Instr., Eng. Mechanics, North Carolina State College (Res., 801 Chamberlain St.), Raleigh, N.C.

Hahn, Robert LeRoy (Jun. '32; Assoc. M. '41), Structural Engr., Jones-Hettelsater Constr. Co., 600 Mutual Bldg., Kansas City, Mo.

Hall, Leslie Standish (Jun. '18; Assoc. M. '21; M. '41), Hydr. Engr., East Bay Municipal Utility Dist., 512 Sixteenth St. (Res., 6016 Broadway), Oakland, Calif.

Hayes, John Marion (Jun. '36; Assoc. M. '41), Asst. Structural Engr., TVA, 315 Union Bldg., Knoxville, Tenn.

House, Harry Mono (Assoc. M. '35; M. '41), Chf. Engr., Dunning-James-Patterson, Box 1925 (Res., 828 North East Park St.), Oklahoma City, Okla.

Hutchinson, Homer Brinson, Jr. (Jun. '37; Assoc. M. '41), 1st Lt., Quartermaster Corps, U.S. Army, Chemical Warfare Service, St. Louis Plant, Monsanto, Ill.

Izatt, John Ormond (Jun. '33; Assoc. M. '41), Materials Engr., Stevens & Koon, Hermiston, Ore.

Jacobs, Roy Kenneth (Jun. '31; Assoc. M. '41), Asst. Prof., Eng. Drawing and Mechanics, Georgia School of Technology, Atlanta, Ga.

Jagger, James Edwin (Jun. '26; Assoc. M. '29; M. '41), Field Secy., Am. Soc. C.E., 33 West 39th St., New York, N.Y.

Larson, Leander (Assoc. M. '20; M. '41), Lt. Col., Quartermaster Corps, U.S. Army, Quartermaster Depot, Independence and Hardesty, Kansas City, Mo.

McFadden, John Joseph, Jr. (Jun. '36; Assoc. M. '41), Eng. Insp., Board of Water Supply, 346 Broadway, New York (Res., Old State Rd., Mahopac), N.Y.

Marks, Sidney Melvin (Jun. '33; Assoc. M. '41), Asst. Civ. Engr., Board of Water Supply, City of New York, Neversink, N.Y.

Nettleton, Elwood Thomas (Assoc. M. '26; M. '41), Civ. Engr., C. W. Blakeslee & Sons, Inc., 58 Waverly St., New Haven (Res., 200 Ridgewood Ave., Hamden), Conn.

Oxford, John W., Jr. (Jun. '30; Assoc. M. '41), Chf. Engr., G. W. Jones & Sons, Box 887, Huntsville, Ala.

Rutt, Frank Edward (Jun. '35; Assoc. M. '41), Associate Engr., U.S. Engr. Office, Federal Bldg. (Res., 226 North Mount Holly Ave.), Louisville, Ky.

Sanchez Diaz, Juan Herminio (Jun. '32; Assoc. M. '41), Asst. Prof., Civ. Eng., College of Agriculture and Mechanic Arts, Box 231, Mayaguez, Puerto Rico.

Strecker, Werner Campbell (Assoc. M. '29; M. '41), Maj., Const. Quartermaster, U.S. Army, Southwestern Proving Ground, Hope, Ark.

Strehan, George Ernest (Jun. '11; Assoc. M. '16; M. '41), Cons. Engr., 33 West 42d St., New York, N.Y.

Switzer, Frederick George (Assoc. M. '20; M. '41), Div. Engr., The Eng. Bureau, Board of Water Supply, 346 Broadway, New York, N.Y.

T'ang, Chen-Hsu (Jun. '38; Assoc. M. '41), Hydr. Designer, Design and Appraisal Div., Ebasco Services, Inc., 2 Rector St., New York, N.Y.

Wilson, John Thomas (Jun. '37; Assoc. M. '41), Structural Engr., Taylor & Taylor, 803 West 3d St., Los Angeles (Res., 2315 Brentford Rd., San Marino), Calif.

Wilson, Thomas Evans, Jr. (Jun. '38; Assoc. M. '41), Res. Engr., State Highway Dept., Box 156, Ridgeland, S.C.

REINSTATEMENTS

Jordan, Joseph Alexander, Assoc. M., reinstated Nov. 18, 1941.

Miller, George Warren, M., reinstated Nov. 12, 1941.

Towne, Lockwood James, M., reinstated Nov. 25, 1941.

Wisehart, William Thomas, Assoc. M., reinstated Nov. 19, 1941.

Applications for Admission or Transfer

Condensed Records to Facilitate Comment from Members to Board of Direction

January 1, 1942 NUMBER 1

The Constitution provides that the Board of Direction shall elect or reject all applicants for admission or for transfer. In order to determine justly the eligibility of each candidate, the Board must depend largely upon the membership for information.

Every member is urged, therefore, to scan carefully the list of candidates published each month in CIVIL ENGINEERING *and to furnish the Board with data which may aid in determining the eligibility of any applicant.*

It is especially urged that a definite recommendation as to the proper grading be given in each case, inasmuch as the grading must be based upon the opinions of those who know the applicant personally as well as upon the nature and extent of his professional experience. Any facts derogatory to the personal character or professional reputation of an applicant should be promptly communicated to the Board.

Communications relating to applicants are considered strictly confidential.

The Board of Direction will not consider the applications herein contained from residents of North America until the expiration of 30 days, and from non-residents of North America until the expiration of 90 days from the date of this list.

MINIMUM REQUIREMENTS FOR ADMISSION

Grade	General Requirement	Age	Length of Active Practice	Responsible Charge of Work
Member	Qualified to design as well as to direct important work	35 years	12 years	5 years RCM*
Associate Member	Qualified to direct work	27 years	8 years	1 year RCA*
Junior	Qualified for sub-professional work	20 years	4 years	
Affiliate	Qualified by scientific acquirements or practical experience to cooperate with engineers	35 years	12 years	5 years RCM*

* In the following list RCA (responsible charge—Associate Member standard) denotes years of responsible charge of work as principal or subordinate, and RCM (responsible charge—Member standard) denotes years of responsible charge of IMPORTANT work, i. e., work of considerable magnitude or considerable complexity.

APPLYING FOR MEMBER

Altieri, August Francis (Affil.), Washington, D.C. (Age 46) (Claims RCM 19.1) July 1940 to date with Brew-Weseley Associates, Inc., Cons. Engrs., Govt. Relations Counselors, and Sales Engrs., Washington, D.C., as Executive Director; 1938 to 1940 with PWA, FWA, Washington, D.C., as Res. Engr. Inspector, etc.; previously Constr. and Cons. Engr. (private practice).

Bigwood, Burke Lincoln (Assoc. M.), West Hartford, Conn. (Age 45) (Claims RCA 3.1 RCM 12.6) April 1919 to date with U.S. Geological Survey as Field Asst., Jun. Engr., Office Engr., and (since June 1929) Dist. Engr.

Burkett, Fred, Fort Worth, Tex. (Age 46) (Claims RCA 2.3 RCM 15.3) Sept. 1932 to May 1933 Project Engr., and May 1935 to date Senior Res. Engr., Texas Highway Dept.; in the interim County Engr., Wilbarger County, Tex.

Cole, Charles Whitmore, Sr., South Bend, Ind. (Age 58) (Claims RCM 28.3) 1938 to date member of firm, Chas. W. Cole & Son, Archt.-Engr., since 1940 on defense projects; previously Cons. Engr. at South Bend, Ind.

Cunningham, Max Lee, Alexandria, La. (Age 61) (Claims RCA 7.8 RCM 17.5) Oct. 1940 to date Dept. Head, in charge of roads and drainage at Camps Polk and Livingston, La.; previously Cons. Engr., Fort Smith, Ark.

Dunstan, James, Wenatchee, Wash. (Age 41) (Claims RC 11.4 D 8.7) Jan. 1938 to date City Engr.; previously Asst. County Engr., Chelan County, Wenatchee, Wash.

Elsener, Lawrence Alois (Assoc. M.), San Francisco, Calif. (Age 41) (Claims RCA 7.6 RCM 10.0) June 1922 to date with Chicago Bridge & Iron Co., as Draftsman, Foreman of Assembly Dept., Timekeeper, Boilermaker's Helper, Contr. Engr., etc., and (since Jan. 1930) Pacific Coast Mgr.

Engstrom, Roy Victor, Wheeling, W.Va. (Age 58) (Claims RCM 33.7) Jan. 1922 to date senior member of firm, Engstrom & Knapp, Eng. Contrs. (later Engstrom & Wynn).

Grady, Hamilton Gamble (Assoc. M.), Los Angeles, Calif. (Age 48) (Claims RCM 15.4) June to Sept. 1938 and Sept. 1940 to date Structural Engr., Bechtel-McCone-Parsons Corporation; Nov. 1938 to June 1940 Structural Engr., Pacific Constructors, Inc.; previously Structural Engr., Paramount Pictures, Inc.

Henderson, George, Bridgetown, Barbados, B.W.I. (Age 44) (Claims RCA 4.1 RCM 6.1) April 1940 to date Colonial Engr., Government of Barbados, B.W.I.; Dec. 1936 to Jan. 1940 Res. Engr., Government of Grenada, B.W.I.

Holzer, Ernest (Assoc. M.), New York City. (Age 41) (Claims RCA 3.0 RCM 12.6) May to Dec. 1936 and May 1938 to Date Valuation Engr., Tax Dept., New York City; in the interim Designing Structural Engr. successively with American Oil Co., and Bryan & Terhune, New York City.

Koffsky, Samuel (Assoc. M.), Albany, N.Y. (Age 39) (Claims RCA 4.3 RCM 8.7) Nov. 1936 to date Chf. Engr., Simmons Machine Tool Corporation.

Larson, Edward, Washington, D.C. (Age 44) (Claims RCA 6.3 RCM 7.1) March 1940 to date Executive Secy., National Soc. of Prof Engrs.; previously member of firm, Turrell & Larson, Cons. Engrs (6 years), and with Larson, Jones & White, Cons. Engrs. (1 year), both in Cincinnati, Ohio.

Laverty, Finley Burnap (Assoc. M.), Pasadena, Calif. (Age 40) (Claims RCA 2.1 RCM 7.2) March 1930 to date with Los Angeles County Flood Control Dist., Los Angeles, as Civ. Engr., and (since Oct. 1934) Chf. Hydr. Engr.

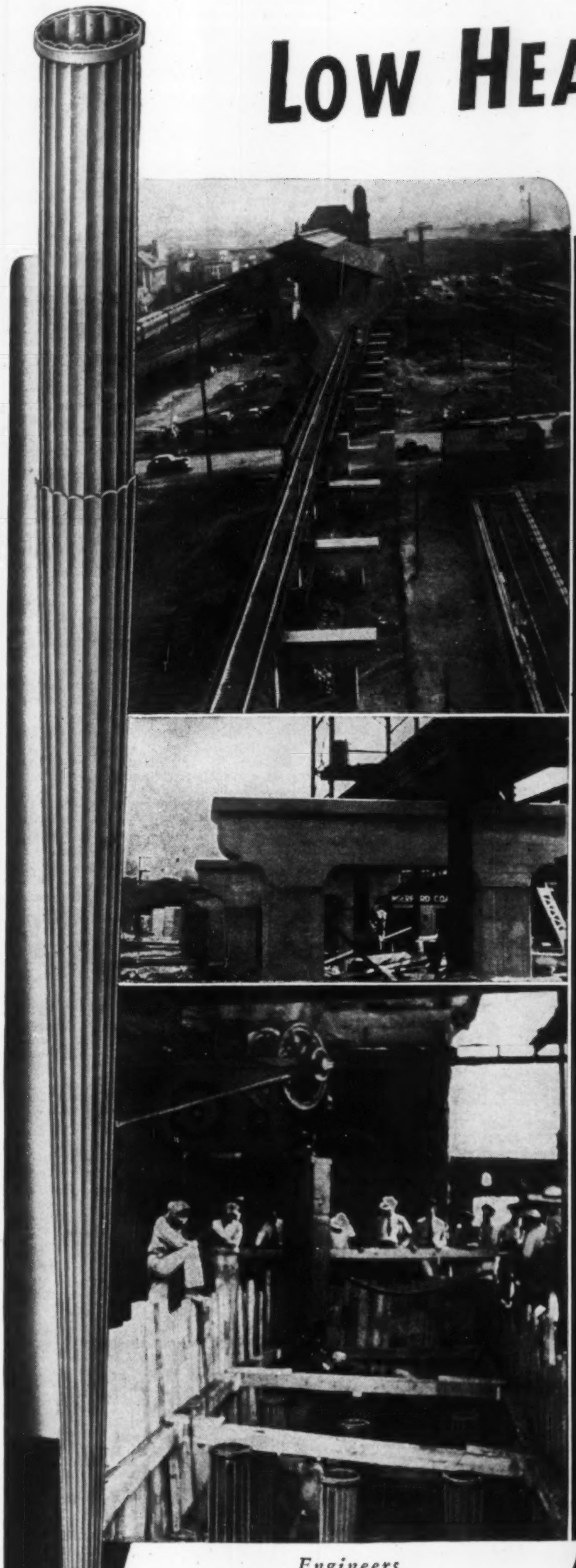
Lawson, Victor Fremont, Buffalo, N.Y. (Age 45) (Claims RCA 2.0 RCM 17.4) 1941 to date with Martin Fireproofing Corporation, in full charge of designing and engineering department; previously Manager and Designer, Anchor Concrete Products, Inc.; in private practice in New York City and Buffalo.

Miller, Garner Wakefield (Assoc. M.), Memphis, Tenn. (Age 54) (Claims RCA 7.3 RCM 22.8) Aug. 1930 to date with U.S. Engr. Office, as Engr., Area Engr., and (since July 1936) Senior and Prin. Engr. Asst. to Officer in Charge of Operations, staff representative of Dist. Engr., and Consultant on flood-control and navigation projects.

Nordstrom, Carl Theodore, Omaha, Nebr. (Age 51) (Claims RCM 29.9) April 1921 to June 1941 Highway Engr., U.S. Bureau of Public Roads, Dist. 4 (PRA of FWA); June to July 1941 Major, and (since July 1941) Lt. Col., Corps of Engrs., U.S. Army.

Nussbaumer, Newell Louis (Assoc. M.), Buffalo, N.Y. (Age 45) (Claims RCA 11.5 RCM 8.0) 1933 to date Pres., Nussbaumer & Clarke, Inc., Engrs., Buffalo, specializing in sanitary engineering projects.

LOW HEADROOM Caused No Headaches On This Piling Job!



Engineers
SEABOARD AIRLINE R. R.
W. D. FAUCETT, *Ch. Engr.*; L. H. HORNSBY, *Bridge Engr.*; T. BRADY, *Resident Engr.*
Contractor
HALEY, CHISHOLM & MORRIS
Charlottesville, Va.

Extendable Monotubes Permit Installation of Elevated Track "Under Traffic" With Big Time and Money Savings

CONSTRUCTION of this 4000-ft. elevated track and viaduct in Richmond, Va., by the Seaboard Airline Railway presented a major piling problem. Plans called for building the structure under the present tracks, which meant driving many of the piles for the 59 piers in locations offering only about 20 ft. of headroom. Only a sectional pile could be used if traffic was to be maintained. Otherwise, traffic would have to be rerouted and portions of the old structure removed at a tremendous cost in both time and money.

Use of Union Metal Extendable Monotubes proved to be the practical solution. 800 of these tapered steel casings, averaging 20 ft. in length, were driven in 10-ft. sections. Despite difficult working conditions, installation of the finished cast-in-place piles was completed in about 50 working days.

The principle of Extendable Monotubes is just this—you drive the main lower tapered section, then add constant taper sections to obtain the desired total length. Any number of extensions, which are available in 12″, 14″, 16″ and 18″ diameters, can be added to produce a cast-in-place concrete pile of the exact length required—thus eliminating unnecessary waste and permitting installation in low headroom areas. Write today for catalog describing Extendable Monotubes—they can speed your job and save you money.

THE
UNION METAL
MANUFACTURING CO.
CANTON, OHIO

PILLEY, EDWARD FEARN (Assoc. M.), Littlefield, Tex. (Age 35) (Claims RCA 1.6 RCM 5.9) Feb. 1941 to date Res. Engr. for Joe E. Ward, Cons. Engr., Wichita Falls, Tex.; previously with Texas Highway Dept., successively as Chainman, Concrete Inspector, Batching Plant Inspector, Office Asst., Instrumentman, Res. Engr., and Jun. Res. Engr.

SORKIN, JOSEF (Assoc. M.), Kansas City, Mo. (Age 35) (Claims RCA 4.5 RCM 5.4) Jan. 1939 to date with Howard, Needles, Tammen & Bergendoff as Bridge Designer, and (since July 1941) Office Engr.; previously Asst. Chf. Structural and Hydr. Design Engr., Central Nebraska Public Power & Irrigation Dist.

SOULE, JOHN EDWARD (Assoc. M.), Atlanta, Ga. (Age 40) (Claims RCA 11.2 RCM 5.3) Jan. 1933 to date with U.S. Army as Capt., and (since July 1940) Major, serving in various capacities, since July 1941 being Chf. of Administrative Div.

STUBER, HARRY WILLIAM, River Edge, N.J. (Age 43) (Claims RCA 8.5 RCM 5.2) Jan. 1935 to date Squad Leader, Ebasco Services, Inc., New York City.

TRUE, WILLIAM HOWARD (Assoc. M.), Coral Gables, Fla. (Age 42) (Claims RCA 6.3 RCM 6.5) Nov. 1939 to date with Ludman Corporation, Miami, Fla. (structural steel fabricating plant), as Chf. Engr. and Production Mgr.; July to Nov. 1939 Steel Detailer, Bethlehem Steel Co.; previously Structural Designer, Paist and Steward, Archts., Miami, Fla.; Structural Detailer and Designer, Aetna Steel Co., Jacksonville, Fla.; Structural Designer and Industrial Investigator, Panama Canal Dept., Balboa Heights, Canal Zone.

WENRICK, JOHN COURTNEY, Cleveland, Ohio. (Age 49) (Claims RCA 6.0 RCM 13.4) Jan. 1936 to date with City of Cleveland as Senior Asst. Civ. Engr., Asst. Commr., and (since June 1939) Commr., of Eng. and Constr.

WHITTLESEY, HAROLD CRUVER (Assoc. M.), Los Angeles, Calif. (Age 45) (Claims RCA 6.4 RCM 13.4) Jan. 1936 to date in private practice as Cons. Engr.

WINTER, FRANCIS ELLIS, Vicksburg, Miss. (Age 55) (Claims RCA 3.9 RCM 23.1) Nov. 1933 to date Res. Engr., FWA, PRA, Eastern National Parks and Forests Dist., Washington, D.C.

YOUNG, WILLIAM DENTON, Cleveland Heights, Ohio. (Age 50) (Claims RCA 2.8 RCM 18.2) At present Director of Public Utilities, City of Cleveland; previously Deputy County Engr. in charge of design and construction, Road Dept., County Engr.'s Office, Cleveland.

APPLYING FOR ASSOCIATE MEMBER

ARNOLD, HUGH MONTGOMERY (Junior), Port of Spain, Trinidad. B.W.I. (Age 32) (Claims RCA 4.2 RCM 2.1) June 1941 to date Capt., Corps of Engrs., U.S. Army; previously with U.S. Engr. Dept., as Student Engr., Jun. Engr., Asst. Engr., and Associate Engr.

BAKER, WILFRED HARMON (Junior), Morgantown, W.Va. (Age 29) (Claims RCA 5.2) March 1941 to date Asst. Prof. of Civ. Eng., West Virginia Univ.; July 1940 to March 1941 Prin. Clerk (Jun. Engr.), Quartermaster's Office, Fort Hamilton, Brooklyn, N.Y.; previously Engr.'s Aide, and Prin. Eng. Aide, AAA, Washington, D.C.; Draftsman, Crucible Steel Co. of America.

BLANK ROTH, CESAR AUGUSTO, (Junior), Caracas, Venezuela. (Age 32) (Claims RCA 2.8) May 1936 to date with Ministry of Public Works, Caracas, Venezuela; since Feb. 1941 as Engr. in charge of construction of Guanare Irrigation System.

BOWLES, CHARLES ALFRED, Oneonta, Ala. (Age 31) (Claims RCA 3.6) Sept. 1933 to July 1937 and April 1938 to date with Alabama Highway Dept., as Computer, Instrumentman, Draftsman, Project Engr., and (since Jan. 1941) Res. Engr.; in the interim Draftsman, Alabama Power Co.

BUNTYN, JAMES RUSSELL, State College, Miss. (Age 31) (Claims RCA 1.0) Oct. 1940 to date Capt., CAC, R.O.T.C. Unit, Mississippi State Coll; April to Oct. 1940 Asst. Supt., Mississippi WPA, Hattiesburg Dist.; previously Instrumentman and Project Engr., Mississippi Highway Dept.

CLIFTON, JOHN RODGERS (Junior), Camp Wallace, Tex. (Age 32) (Claims RCA 7.3) Dec. 1940 to date Capt., CAC, U.S. Army; Oct. to Dec. 1940 Camp Supt., SCS; previously with Land Utilization Div., FSA, as Asst. Engr. and Project Mgr.

COTTON, JOHN CASKEY (Junior), South Bend, Ind. (Age 32) (Claims RCA 5.8) Sept. 1933 to date with U.S. Dept. of Agriculture as Draftsman, Surveyor, Jun. Engr., etc., and (since Jan. 1940) Asst. Engr.

CROPSEY, WILLIS HAWLEY, South St. Paul, Minn. (Age 45) (Claims RCA 11.7) April 1933 to date with City of South St. Paul, Minn., as City Engr. and Supt. of Water Dept.; and (since July 1940) Chf. Engr. and Supt. of sewage-treatment plant.

DAVES, JOEL THOMAS, Atlanta, Ga. (Age 43) (Claims RCA 12.6 RCM 2.3) Aug. 1939 to date Sales Engr., Culvert Div., Tennessee Coal, Iron & R.R.Co.; previously Asst. Div. Engr., Div. Engr., Constr. Engr., and Federal Contact Engr., Georgia Highway Dept.; Locating Engr. and Res. Engr., Alabama Highway Dept.

DE LAWDER, CLYDE ERNEST, Tiquisate, Guatemala, C.A. (Age 33) (Claims RCA 2.9) Jan. 1938 to date with Cia Agricola de Guatemala, Tiquisate, as Project Engr., and (since Feb. 1939) Chf. Engr.; previously with Truxillo R.R. Co., Puerto Castilla, Honduras, as Instrumentman, Engr., and Project Engr.

EDMONSTON, THOMAS RITCHIE (Junior), Chevy Chase, Md. (Age 32) (Claims RCA 2.9) Feb. 1939 to date Engr. and Estimator, E. P. Knollman, Engrs. and Contrs., Washington, D.C.; previously Designer, Estimator and Structural Draftsman, R. H. H. Spidel, Washington, D.C.; Detailer and Designer, Rosslyn Steel & Cement Co.

ELLIOT, DONALD GEORGE (Junior), Montreal, Que., Canada. (Age 32) (Claims RCA 5.8 RCM 1.5) May 1939 to date Structural Engr., The Aluminum Co. of Canada, Montreal; previously Asst. Engr., Arthur Surveyor & Co., Cons. Engrs.; Designing Draftsman, Asst. Mill Engr. and Control Engr., The Anglo-Newfoundland Development Co. Ltd., Grand Falls, Newfoundland.

FICARRATTO, SADO CARL (Junior), Sacramento, Calif. (Age 33) (Claims RCA 1.5) Nov. 1933 to date Jun. Engr., U.S. Engrs.

FRANTZ, LUTHER MARSHALL, Baltimore, Md. (Age 41) (Claims RCA 13.1 RCM 2.3) Feb. 1941 to date San. Designer, Whitman, Requardt & Smith, Engrs.; previously with Bethlehem Steel Co., Sparrows Point, Md., as Civ. Engr., Structural Designer, and Draftsman.

GARVER, MARK GILLESPIE, Baltimore, Md. (Age 33) (Claims RCA 2.8 RCM 0.3) Aug. 1941 to date Designing Engr., J. E. Greiner Co., Cons. Engrs., Baltimore, Md.; previously Jun. Engr. and Asst. Engr., Fabricated Steel Constr. Div., Bethlehem Steel Co.; Asst. Engr., Bridge Div., Louisiana Highway Comm.

GLADFELTER, WILLIAM EDWIN (Junior), Detroit, Mich. (Age 33) (Claims RCA 3.6 RCM 0.2) March 1941 to date with U.S. Naval Ordnance as Senior Constr. Inspector, and (since Oct. 1941) Assoc. Constr. Engr.; previously Field Engr., Smith-Lipman Constr. Co.; Project Engr., WPA; Inspector with General Motors Corporation, and U.S. Engrs., War Dept.; Draftsman, City of Detroit.

GOODPASTURE, ROBERT ABRAHAM (Junior), Abilene, Tex. (Age 32) (Claims RCA 1.8) Sept. 1940 to date with 157th Infantry, U.S. Army as 2d Lt., and (since Jan. 1941) 1st Lt., being Platoon Commdr. and Motor Maintenance Officer, Camp Barkeley, Tex.; previously Laboratory Asst., Jun. Engr., and Asst. Engr., U.S. Bureau of Reclamation.

HICKS, ELMER ROBERT, Pittsburgh, Pa. (Age 42) (Claims RCA 9.6 RCM 6.8) April 1941 to date Tower Engr., Blaw-Knox Co.; previously Structural Engr., with General Motors Corporation, Frantz & Spence, and Dow Chemical Co.

JACOB, CHARLES EDWARD, Flushing, N.Y. (Age 27) (Claims RCA 1.7) July 1936 to date with U.S. Geological Survey as Jun. Hydr. Engr., and (since April 1939) Asst. Hydr. Engr.

JONES, LOUIS EDWARD (Junior), Lombard, Ill. (Age 33) (Claims RCA 2.2 RCM 3.3) Oct. 1941 to date Constr. Engr., Milton H. Callner Constr. Co., Chicago; previously with Montgomery Ward & Co., Chicago, Ill., as Constr. Supt., and Cost. Engr., etc.

KAROL, JACOB, Kansas City, Mo. (Age 34) (Claims RCA 1.2 RCM 4.4) June 1938 to date Designer, Howard-Needles-Tammen & Bergendoff, Kansas City, Mo.; previously graduate student (fellowship).

KOMIAKOFF, LEO NICHOLAS (Junior), New York City. (Age 32) (Claims RCA 5.0) June 1937 to May 1938 and Jan. 1939 to date with Board of Water Supply, New York City, as Eng. Asst. (1 month), and Eng. Inspector; in the interim Asst. Civ. Engr., Bureau of Agri. Eng., U.S. Dept. of Agriculture, Washington, D.C.; previously Asst. Structural Engr., Office of Quartermaster General, War Dept., U.S. Army; Senior Foreman, Engr., National Park Service, U.S. Dept. of Interior, Port Jervis, N.Y.

KRAMER, EDWIN WEED, JR., Sacramento, Calif. (Age 34) (Claims RCA 8.2) April 1941 to date with U.S. Bureau of Reclamation as Associate Engr., Gen. Investigations Div., California; previously with U.S. Dept. of Agriculture as Asst. Engr. and Associate Engr.

LEON, FELIX ANTONIO, Boulder, Colo. (Age 36) (Claims RC 2.8 D 3.3) 1935 to 1940 with Div. of Highways, Dept. of Interior, San Juan, as Asst. Civ. Engr.; 1940 to date student, Univ. of Colorado.

LITTLE, WALTER BURGESS (Junior), Seattle, Wash. (Age 32) (Claims RCA 2.6 RCM 1.2) Oct. 1939 to date with U.S. Engr. Dept. on Mud Mountain Dam project, as Asst. Office Engr., and (since Oct. 1940) Office Engr.; previously Instructor, Gen. Eng. Dept., Univ. of Washington.

McCOY, BYRON OMAR, Buffalo, N.Y. (Age 29) (Claims RCA 4.8) Feb. 1937 to date Asst., William P. Creager, Cons. Hydr. Engr.; previously with U.S. Forest Service as Asst. Truck Trail Locator, and Truck Trail Locator.

MAIER, FRANZ JOSEPH (Junior), Jackson Heights, N.Y. (Age 32) (Claims RCA 3.3 RCM 2.0) Sept. 1936 to Jan. 1940 Asst. Public Health Engr., and Jan. 1940 to date Associate Public Health Engr., U.S. Public Health Service, New York City.

MOLNAR LOUIS ANDREW (Junior), Culver City, Calif. (Age 31) (Claims RCA 7.8) June 1941 to date Structural Engr., California Shipbuilding Corporation, Terminal Island; previously Structural Draftsman and Designer, Bechtel-McCone-Parsons Corporation, Los Angeles; with Standard Oil Co. of Venezuela as Topographical Draftsman and Field Engr.

MORGAN, NEWLIN DOLBEY, JR. (Junior), New Brunswick, N.J. (Age 27) (Claims RCA 0.9 RCM 0.2) Sept. 1941 to date Instructor, Dept. of Civ. Eng., Rutgers Univ.; Sept. 1939 to Sept. 1940 and June to Aug. 1941 with New Mexico State Highway Dept., designing steel, concrete, and timber culverts, bridges, etc.; in the interim with Constr. Quartermaster, San Antonio, Tex.; previously with Wyoming State Highway Dept., Cheyenne, Wyo.

MUNOZ, CARLOS ALBERTO (Junior), Santurce, Puerto Rico. (Age 33) (Claims RCA 2.7) Aug. 1938 to date with U.S. Engr. Office, Puerto Rico Dist. as Surveyman, Prin. Eng. Aide, Chf. Eng. Aide and (since May 1941) Asst. Engr.; previously Asst. Engr., Puerto Rico Irrigation Service, Guayama, Puerto Rico; Asst. Engr., and Civ. Engr., Puerto Rico RA, San Juan.

NEFF, ALLISON CLEVELAND, Cleveland, Ohio. (Age 39) (Claims RCA 5.0 RCM 3.7) Dec. 1928 to date with The Ohio Corrugated Culvert Co., as Engr., and (since Jan. 1938) Manager, Cleveland Office.

NIXON, MARION BLAIR, Atlanta, Ga. (Age 42) (Claims RCA 15.0 RCM 2.0) 1921 to date with Constr. Dept., City of Atlanta, Ga., as Engr., Street Div., Engr.-Inspector, Bridge Div., and (since 1924) Asst. Engr. of Sewers.

NOTTINGHAM, HOWARD DAILEY, Washington, D.C. (Age 28) (Claims RCA 0.9 RCM 2.4) Dec. 1940 to date with U.S. Army as Asst. Constr. Quartermaster, and (since May 1941) Constr. Quartermaster; previously Engr., W. S. Lee Eng. Corporation, Charlotte, N.C.; Timekeeper and Instrumentman, Potter & Shackelford, Greenville, S.C.

OTTERSON, GEORGE LEONARD, Diablo Heights, Canal Zone. (Age 33) (Claims RCA 8.0 RCM 1.2) Jan. 1941 to date with Special Eng. Div., The Panama Canal as Asst. Engr. (Civ.), and (at present) Associate Engr. (Civ.); previously with U.S. Engr. Office as Inspector, Surveyman, Jun. Engr., and Res. Engr.

PFEILER, ARNO JOSEPH, Clayton, Mo. (Age 30) (Claims RCA 6.6) May 1939 to date Prin. Office and Design Engr. with Edward A. Fulton, Cons. Engr., St. Louis, Mo.; previously San. Sales Engr., The Dorr Co., Inc., New York City.

PRITCHARD, ELMER MARION (Junior), Brownwood, Tex. (Age 33) (Claims RCA 3.5) June 1936 to date with Texas State Highway Dept. as Office Asst., Asst. Office Engr., and (since July 1939) Office Engr. and Dist. Lab. Engr.

RAWLINGS, JUNIUS HAWES, St. Louis, Mo. (Age 50) (Claims RCA 21.5) April 1918 to date with Missouri Pacific R.R. Co., as Instrumentman, Asst. Engr., and Engr. Accountant, Valuation Dept.

RENTENBACH, THOMAS JOSEPH (Junior), Diablo Heights, Canal Zone. (Age 30) (Claims RCA 4.2 RCM 0.9) Feb. 1941 to date Engr., Special Eng. Div., The Panama Canal; Dec. 1933 to Jan. 1941 with U.S. Engr. Office as Axeman, Surveyman, Inspector, Jun. Engr., Asst. Engr., and Associate Engr.

RUDDY, JOHN MICHAEL (Junior), Liberty, N.Y. (Age 32) (Claims RCA 3.1) April 1941 to date

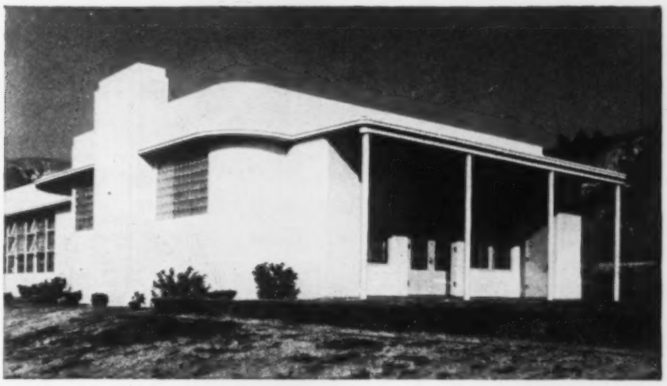
SMOOTH AS CONCRETE FORMED AGAINST PLYFORM

This concrete form grade of Douglas Fir Plywood serves as sheathing and lining combined

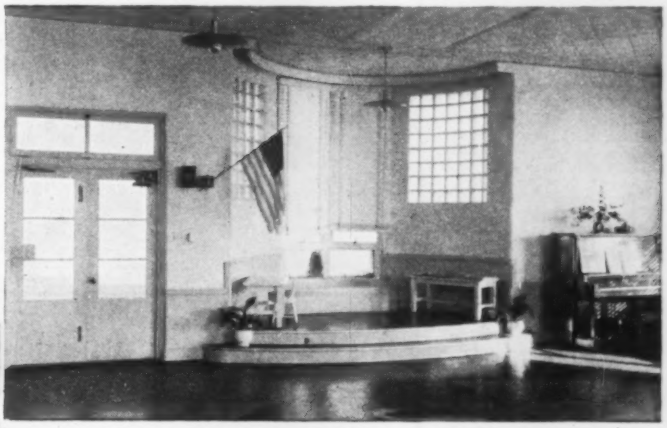
When plans and specifications call for smooth exposed concrete surfaces, form them against Plyform — the grade of Douglas Fir Plywood made especially for concrete form work. Only special highly water-resistant premium glues and selected veneers are used in Plyform, in accordance with U. S. Commercial Standard CS45-40. The panels are sanded satin-smooth, oil-treated and edge-sealed at the mill. This means that they're ready to work for you the instant you receive them. And if you give them reasonable care, they'll give you numerous re-uses.

Every 4′ x 8′ Plyform panel covers 32 square feet — giving you full value for your form dollar. Plyform works easily with all tools and can be nailed without boring holes. Its combination of strength and light weight simplifies carpentry and handling. Because of its non-absorbent uniform surface, concrete formed against Plyform is not mottled, stained or colored. Joints and fins are absolutely minimized. Cost of rubbing labor is cut from 5c to 12c a square foot.

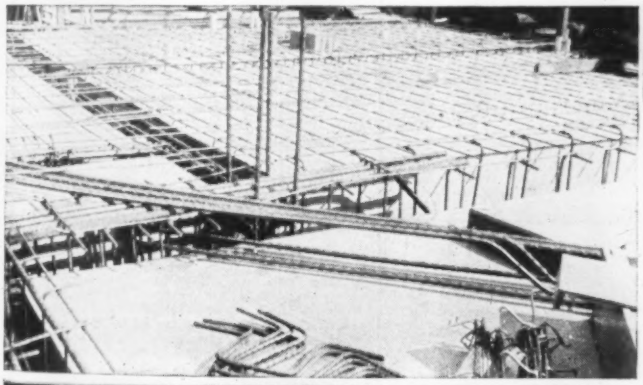
There are outstanding Plyform jobs in every part of the United States. See them . . . study them . . . *and use Plyform on your next job.*



FLAT OR CURVED SURFACES can be formed equally well against Plyform. Proof is this detail from the beautiful Lou Henry Hoover School in Whittier, Calif. Wm. H. Harrison was the architect; J & B Construction Co., the contractor.

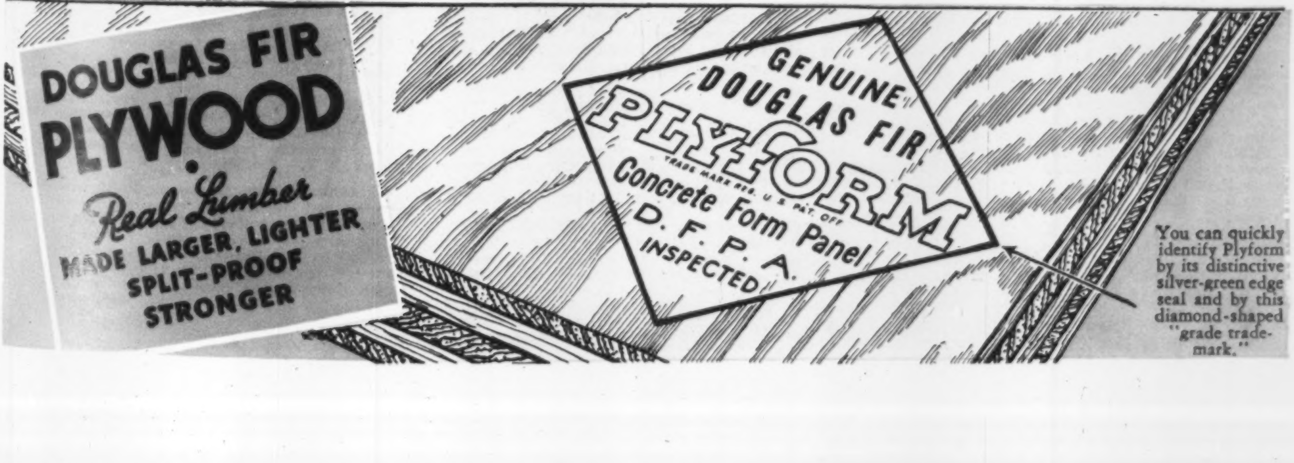


THE INTERIOR WALLS of the Lou Henry Hoover School were also formed against Plyform because they had to be flawless, too. There was no plastering. Paint was applied directly to concrete.



***Left:* PLYFORM FLOOR SLAB AND GIRDER FORMS** in place ready for pouring at Marion Housing Project, Jersey City, N. J. Each panel covers 32 square feet, minimizing amount of form material needed as well as carpentry and handling. George Siegler Company was the contractor.

WRITE FOR FREE CONCRETE FORM BOOKLET. Contains complete data about Plyform. Douglas Fir Plywood Assn., Tacoma, Wn.



You can quickly identify Plyform by its distinctive silver-green edge seal and by this diamond-shaped "grade trade-mark."

Engr. Inspector, Grade 4, Board of Water Supply, Neversink, N.Y.; previously Engr. Asst., Grade 3, Board of Transportation, New York City; Senior Engr., Grade 3, and Jun. Engr., P-1, Brooklyn Navy Yard, New York City.

Sachse, Alfred John (Junior), Coeur d'Alene, Idaho. (Age 33) (Claims RCA 1.3 RCM 1.4) June 1928 to Jan. 1940 and May 1940 to date with Idaho Bureau of Highways successively as Rodman, Chainman, Levelman, Computer, Inspector, Asst. in Roads Materials Testing Laboratory, Transitman, Jun. Draftsman, Dist. Materials Engr., and (since Sept. 1941) Res. Engr.; in the interim County Engr., Ada County, Idaho.

Schoeller, Charles Philip (Junior), Honolulu, T.H. (Age 32) (Claims RCA 4.8 RCM 1.0) July 1940 to date Project Engr., Wake Island Naval Air Base, Pacific Naval Air Base Contrs.; previously with C. Deuel, Structural Engr., Los Angeles, Calif., as Structural Designer, and Co-Partner.

Seitz, Bradley George (Junior), Binghamton, N.Y. (Age 32) (Claims RCA 2.9) May 1933 to date with U.S. Engr. Office as Inspector, Jun. Engr., Asst. Engr., and (since Oct. 1941) Associate Engr.

Simon, William John (Junior), Los Angeles, Calif. (Age 33) (Claims RCA 5.8) Oct. 1935 to date Jun. Civ. Eng., Los Angeles Dept. of Water & Power.

Spalding, Prescott Oulton (Junior), South Portland, Maine. (Age 32) (Claims RCA 1.3) Sept. 1940 to date Constr. Engr. and Supt. with Ellis C. Snodgrass, Portland, Maine; March 1939 to Sept. 1940 Bldg. Inspector and Acting Campus Engr., Univ. of Maine, Orono, Maine; previously Chf. of Party, Maine State Highway Planning Survey; Field Engr., Sanders Eng. Co., Portland.

Stanley, Wyatt Richard (Junior), Amarillo, Tex. (Age 32) (Claims RCA 4.2 RCM 3.7) March 1938 to date Asst. Hydr. Engr., Bureau of Agricultural Economics; Feb. 1937 to March 1938 Engr., FSA; previously Asst. Agri. Engr., and Engr., RA.

Stocker, Frank Raymond (Junior), Coraopolis, Pa. (Age 32) (Claims RCA 7.5 RCM 1.8) Aug. 1930 to date with Edeburn, Cooper & Co., Pittsburgh, Pa., since 1933 being an officer of Company.

Swanson, Joseph Leedom, Jr., New Orleans, La. (Age 30) (Claims RCA 5.6) Aug. 1937 to date Constr. Engr., The Texas Co.; previously with WPA, New Orleans, as Project Engr., and Project Supt.

Taylor, James Donald (Junior), St. Paul, Minn. (Age 32) (Claims RCA 2.8) June 1940 to date Office Asst. to Vice-Pres. of Operation, Great Northern Ry. Co.; previously Eng. Asst. to Chf. Subway Engr., Chicago Subway Comm.; Tracer and Draftsman, Bridge Dept., Chicago, Burlington & Quincy R.R.

Turner, William Wesley, Milan, Tenn. (Age 31) (Claims RCA 2.0 CM 6.1) Feb. 1941 to date Highway Engr., The H. K. Ferguson Eng. Co., Inc., Cleveland, Ohio; previously Senior Designer, Tennessee State Highway Dept., Nashville, Tenn.

Wang, Hanley Arthur, Los Angeles, Calif. (Age 35) (Claims RCA 1.2) July 1925 to date with City of Los Angeles, as Chainman, Instrumentman, Draftsman, Asst. Zoning Engr., and (since Oct. 1940) Jun. Civ. Engr., Div. of Bridges and Structures.

Wellborn, Arvin Sparks, Magnolia, Ark. (Age 30) (Claims RCA 4.0 RCM 0.7) April 1941 to date Chf. Engr., Highway Emulsions Inc., of Dayton, Ohio; previously Laboratory Technician and Soils Engr., Arkansas Highway Dept.

Werner, Bernard Louis, Baltimore, Md. (Age 39) (Claims RCA 10.0 RCM 1.1) 1923 to date with City of Baltimore, 2 years with Bureau of Plans and Surveys, and since 1925 with Bureau of Water Supply in various capacities.

APPLYING FOR JUNIOR

Abrina, Rizal Donalbo, Dayton, Ohio. (Age 31) April 1939 to date with U.S. Engr. Office, at Cincinnati, Ohio, and at present Dayton, Ohio.

Allen, Ocie Carl, Brownsville, Tex. (Age 27) Jan. 1941 to date with Pan American Airways, Airport Development Dept., as Field Engr. and Asst. Office Engr.; previously with Texas Highway Dept., as Rodman, Chainman, Draftsman, and Asst., under Office Engr.

Bona, Louis Eugene, Little Rock, Ark. (Age 26) July 1939 to date with U.S. Engrs. as Eng. Aide, Jun. Engr., and (since Nov. 1941) Asst. Engr.; previously Tracer, Arkansas Highway Dept., State Highway Comm.

Cole, Charles Whitmore, Jr., South Bend, Ind. (Age 26) (Claims RCA 3.3) 1938 to date member of firm, Charles W. Cole & Son, Archt.-Engr., since 1940 on defense projects.

Evans, William Spearing, New Haven Conn. (Age 28) (Claims RCA 1.0) Sept. 1941 to date graduate student, Yale Graduate School of Civ. Eng.; previously Job. Capt. with Samuel G. Weiner, Archt.; Designer and Draftsman, Neild, Somdal & Neild, Archts.; Designer, Estimating Dept., The Austin Co., New York City; Draftsman, Harrison, Fouilhoux & Abramovitz, Archts. and Engrs.

Grillo, Odair, São Paulo, Brazil. (Age 30) (Claims RCA 2.3 RCM 0.5) Jan. 1939 to date Chf., Div. of Soils and Foundations, Inst. for Technological Research of São Paulo, Brazil; previously at various soil mechanics laboratories, and taking graduate courses at Harvard Univ., etc.

Lobenstein, Walter Henry, Jr., Palo Alto, Calif. (Age 27) (Claims RCA 1.5) July 1941 to date Jun. Engr., U.S. Engr. Dist.; previously Draftsman for Russell Mills, Archt., Reno, Nev.; Chainman, Instrumentman, and Concrete Inspector Metropolitan Water Dist. of So. Calif.

Piper, Harry William, Washington, D.C. (Age 24) (Claims RCA 0.8) Nov. 1941 to date Chf. Structural Eng. Draftsman, Bureau of Yards and Docks, Navy Yard, Washington, D.C.; Jan. to Nov. 1941 Structural Engr. and Plan Examiner, Arlington County (Va.) Bldg. Dept.; previously Structural Engr., Bldrs.' Steel Products Corporation; Draftsman with Dana B. Johannes, Jr., Archt.-Designer.

Pratt, Jack Wilson, Berkeley, Calif. (Age 24) Sept. 1940 to date with California Dept. of Public Health as Asst. State Director, Community Sanitation, and (since Nov. 1940) Asst. San Engr.; previously Draftsman, Wallace & Tiernan Sales Corporation, San Francisco, Calif.

Shipman, Roy Marvin, Santurce, Puerto Rico. (Age 25) Sept. 1941 to date Structural Designer, Arundel & Consolidated, San Juan, Puerto Rico; previously Designer, Frederic R. Harris, Inc., New York City; Eng. Draftsman, Lower Colorado River Authority, Austin, Tex.; Rodman and Jun. Inspector, Texas Highway Dept.

Strandhagen, Adolf Gustave, Pittsburgh, Pa. (Age 27) June 1939 to June 1941 graduate student and Sept. 1941 to date Instructor in Applied Mechanics, Carnegie Inst. of Technology.

1941 GRADUATES

CORNELL UNIV.
(M.C.E.)

	Age
Plog, Charles Bartol (also 1940 B.S.C.E., Univ. of Wis.)	(23)

LAFAYETTE COLL.
(B.S. in Civ. Eng.)

Taggart, William Nagele	(23)

N.Y. UNIV.
(B.C.E.)

Imperato, Nicholas Flloyd	(26)
Kelly, Thomas Laughlin	(23)
Martone, Adolph Nicholas	(29)

UNIV. OF PITTSBURGH
(B.S.)

Maggi, Elmer James	(22)

SO. METHODIST UNIV.
(B.S. in Civ. Eng.)

Mann, George Boley	(29)

VA. POL. INST.
(B. S. in Civ. Eng.)

Sackheim, Abbot Abraham	(20)

The Board of Direction will consider the applications in this list not less than thirty days after the date of issue.

Men and Positions Available

These items are from information furnished by the Engineering Societies Personnel Service, with offices in Chicago, Detroit, New York, and San Francisco. The Service is available to all members of the contributing societies. A complete statement of the procedure, the location of offices, and the fee is to be found on page 141 of the 1941 Year Book of the Society. To expedite publication, notices of positions available should be sent direct to the Personnel Service, 31 West 39th Street, New York, N.Y. Employers and applicants should address replies to the key number, care of the New York Office, unless the word Chicago, Detroit, or San Francisco follows the key number, when it should be sent to the office designated.

EXECUTIVE

Civil Engineer; M. Am. Soc. C.E.; Connecticut license; age 55; married; responsible charge of design and reconstruction of railway system, $15,000,000 industrial factory, army camps, and general industrial management; capable organizer and administrator; at present retired after selling profitable business but anxious to be of service during national emergency. Any location in the United States considered. C-896.

Civil Engineer; M. Am. Soc. C.E.; 25 years executive experience, handling surveys, design, and construction for filtration, irrigation earth dams, roads, docks, jetties, dredging, and buildings. Assistant engineer, U.S. Bureau of Reclamation; director, Dominican Department of Public Works; industrial engineer, Indiana Limestone Company; manager and chief engineer, Salt-Soil Road Bureau; speaks Spanish and Portuguese. Successful pioneer, especially Spanish America. C-897.

JUNIOR

Civil Engineer; Jun. Am. Soc. C.E.; B.S. in C.E., University of New Hampshire, 1941; desires position with private organization that will not terminate at the close of present emergency; prefers structural design or construction work. Experience, 3 months drafting and surveying; 4 months inspecting highway construction; 6 months office engineering connected with Air Base construction. C-894.

Young Civil Engineer; Jun. Am. Soc. C.E.; 27; M.I.T. degree; married; 4 1/2 years experience over board on bridges and structures. Would like to make contact with firm that can use education and all around background in sales work related to engineering. C-895.

POSITIONS AVAILABLE

Dredging Expert with considerable experience. Prefer engineer who has had some salvaging experience. Will represent the owners on two salvaging operations. Temporary. Salary open. Location, Middle West. Y-9036.

Civil Engineer, 35–45, to check designs, specifications, plans. Some experience in electricity and mechanics desirable. Half construction and half design. Salary, $3,000–$3,900 a year. Location, Virginia. Y-9055.

Draftsmen, 3, experience on topographical work, surveying, etc. Salary, $3,900 a year. Location, Trinidad. Y-9070.

Construction Superintendent, graduate engineer, with a substantial background, preferably with defense work experience. Location, South. Y-9260.

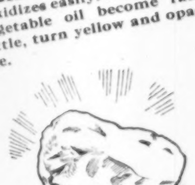
Engineers, 5, for hydroelectric power studies on two large river systems. Duration, a year to a year and a half. Salaries: Draftsmen, $1,800–$2,160 a year, to engineer in charge of studies, $3,800–$4,600 a year. Location, South. Y-9261.

General Construction Superintendent to take charge of field construction for large munitions plant. Experience in present national defense projects preferred. Headquarters, New York, N.Y. Y-9288.

Graduate Civil Engineer, 30–40, with actual design and construction experience in structural steel buildings, waterfront facilities such as docks and floats, reinforced concrete, and various miscellaneous installations, such as water systems, sewage systems, and electric power systems. Should have good personality and original and

MINERAL OIL. Most tracing papers are treated with some kind of oil. Mineral oil is physically unstable, tends to "drift", never dries completely. Papers treated with mineral oil pick up dust, lose transparency with age.

VEGETABLE OIL, chemically unstable, oxidizes easily. Papers treated with vegetable oil become rancid and brittle, turn yellow and opaque with age.



ALBANITE is a crystal-clear synthetic solid, free from oil and wax, physically and chemically inert. Because of this new stabilized transparentizing agent Albanene is unaffected by harsh climates—will not oxidize with age, become brittle or lose transparency.

A crystal-clear synthetic solid age-proofs this tracing paper

No oil, no wax—but a remarkable new transparentizing agent developed in the K&E laboratories—produces this truly permanent tracing paper! ALBANENE is made of 100% long fiber pure white rags—treated with *ALBANITE*—a new crystal-clear synthetic solid, physically and chemically inert. ALBANENE will not oxidize, become brittle or lose transparency with age.

Equally important, ALBANENE has a fine hard "tooth" that takes ink or pencil beautifully and erases with ease ... a high degree of transparency that makes tracing simple, produces strong sharp blueprints ... extra strength to stand up under constant corrections, filing and rough handling. ALBANENE has *all* the working qualities you've always wanted—and *it will retain all these characteristics indefinitely.*

Try ALBANENE yourself on your own drawing board. Ask your K&E dealer, or write us, for an illustrated brochure and a generous working sample.

EST. 1867
KEUFFEL & ESSER CO.
NEW YORK—HOBOKEN, N. J.
CHICAGO · ST. LOUIS
SAN FRANCISCO · LOS ANGELES · DETROIT · MONTREAL

K&E *Albanene*
REG. U. S. PAT. OFF.
ABILIZED TRACING PAPER

flexible mind. Permanent. Salary, \$3,600–\$4,200 a year. Location, New York Metropolitan Area. Y-9311.

Structural Squad Leader to supervise group of designers engaged in designing structural steel and reinforced concrete mill buildings, power plants, and timber structures. Must have had steel mill experience and a knowledge of rigid-frame design. Salary, \$4,800 a year. Location, Middle West. Y-9374.

Building Estimator. Must be experienced in taking off quantities on buildings. Prefer graduate engineer with some field experience, a knowledge of costs, and recent experience on government buildings. Should have a car and be willing to work long hours. Salary, \$3,900 a year. Headquarters, Pennsylvania. Y-9381.

Structural Designers who have had good all-around experience. Should know reinforced concrete and structural steel. Salary open. Location, New York Metropolitan Area. Y-9470.

Construction Engineer who has had considerable experience in the field directing heavy construction projects. Should be able to oversee hydraulic structures—that is, seawalls, docks, and terminals—some sewage, railroad, highway, and other general construction. Will work directly under the project engineer. Salary, \$8,000–\$9,000 a year. Location, foreign. Y-9476.

Structural Layout Men or Structural Detailers, either over 40, with considerable experience, or younger, if less experienced. Require a combination of structural steel, machine, and sheet metal design. Location, Pennsylvania. Y-9480.

Graduate Civil Engineer, young, to act as an assistant to a construction superintendent and do field engineering work in connection with the construction of a water supply filtration plant. Experience in this field would be desirable. Salary open. Location, South. Y-9486.

Construction Superintendent and Field Engineer with experience in the erection of small prefabricated houses. Salary open. Location, New York, N.Y. Y-9490.

Foremen. These men must have had wide, general, all-around experience—no specialists. Should be experienced in paving, form work, steel erection, concrete work, timber work, etc. Must assume single status. Duration, 9 months to, possibly, 2 years. Salary, \$5,200–\$6,240 a year (plus time and half for overtime), plus meals, room, laundry, and traveling expenses. Location, Africa. Y-9494.

Superintendent and General Foreman on railroads, excavation, roads, utilities, runways, etc. (*a*) Superintendent should have all-around heavy construction experience and some knowledge of concrete aggregates. (*b*) Foreman should have, to a lesser degree, experience in the above and be capable of assuming the duties of the superintendent if necessary. Must assume single status. Duration, 9 months to, possibly, 2 years. Salary, \$6,000–\$10,000 a year, plus room, meals, laundry, and traveling expenses. Location, Africa. Y-9497.

Assistant General Superintendent. Must be high-class man of very wide experience, who would be capable of assuming general superintendent's duties if necessary. Man will have to handle erection of living quarters, shops, and electrical and plumbing services for same; compressed air system, heavy installation of industrial equipment, building of water supply and sewage disposal, roads, and runways. Must assume single status. Duration, 9 months to, possibly, 2 years. Salary, \$8,000–\$10,000 a year, plus meals, room, laundry, and traveling expenses. Location, Africa. Y-9498.

Building Superintendent and General Foreman. (*a*) Superintendent must be experienced in camp type buildings, very rough construction—no finished carpenter work, concrete floor, etc. (*b*) Foreman should have, to a lesser degree, experience in the above and be capable of assuming the duties of the superintendent if necessary. Must assume single status. Duration, 9 months to, possibly, 2 years. Salary, \$6,000–\$10,000 a year, plus meals, room, laundry, and traveling expenses. Location, Africa. Y-9499.

Instrumentman and Chief of Party. Salaries: Instrumentman, \$3,000 a year; chief of party, \$3,200 a year. Location, South. Y-9500.

Civil Engineers. Superintendent and assistant superintendent, engineers, chief of party, surveyors, etc., on heavy construction. Duration, 2 to 3 years. Location, foreign. Y-9507.

Designers who have had sewage, water supply, and topographical experience; also good surveyor with topographical background. Salary open. Location, New York, N.Y. Y-9521.

Superintendent of Construction on a water filtration plant. Should have had at least 5 years experience. Salary open. Location, New Jersey. Y-9571.

Draftsmen, civil engineers, who have had some experience on railroad work. Must know tract layout, curves, drainage calverts, etc. Duration, 6 to 9 months. Location, New York, N.Y. Y-9581.

Structural Steel Draftsmen experienced on industrial plant layout. Salary, \$2,600–\$3,120 a year. Location, New York, N.Y. Y-9582.

RECENT BOOKS

New books of interest to Civil Engineers donated by the publishers to the Engineering Societies Library, or to the Society's Reading Room will be found listed here. The notes regarding the books are taken from the books themselves, and this Society is not responsible for them.

(An) Approximate Measure of Earthquake Effect on Framed Structures. By R. S. Chew. Revised June 25, 1941. Richard Sanders Chew, 844-a Mills Building, San Francisco, Calif. 96 pp., diagrs., charts, tables, $11 \times 8^1/_2$ in., paper, manifold, \$5.

The intention of this work is to provide architects and engineers with a practical viewpoint and solution of the earthquake problem within certain defined limits. The major part of the book consists of a practical rather than mathematical attempt to indicate approximately the effect on a structure of oscillation of its foundation in a horizontal direction. A theoretical treatment of the problem is appended.

Building Insulation. By P. D. Close. American Technical Society, Chicago (Ill.), 1941. 328 pp., illus., diagrs., charts, tables, $8^1/_2 \times 5^1/_2$ in., cloth, \$3.

The principles and applications of insulation are described as used to retard heat losses and gains, and to guard against fire, sound, vibration, and condensation in buildings. Considerable reference data and many practical examples of calculation procedures are included.

Fluid Mechanics and Statistical Methods in Engineering. (University of Pennsylvania Bicentennial Conference.) By H. L. Dryden, T. von Kármán, and others. University of Pennsylvania Press, Philadelphia, 1941. 146 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, \$1.75.

The eight papers, which are by recognized authorities, are divided into two groups. Four of them deal with turbulence and related topics in the field of fluid mechanics. The other four, grouped under the heading of statistical methods in engineering, range from the contribution of statistics to purchasing specifications to the application of the statistical method in legislation.

Handbook of Sleeve Bearings. By A. B. Willi. Federal-Mogul Corporation, Detroit (Mich.), 1941, illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth. (Available only to those directly concerned with sleeve-bearing installations.)

This practical guide for the engineer, designer, and draftsman deals with the selection, design, and application of sleeve bearings. It discusses, for example, the effect of design, materials, and manufacturing methods upon sleeve-bearing efficiency and other special topics of major importance in setting up bearing specifications. There is a large reference section listing many sizes and types of bearings for which major manufacturing tools are now available.

Higher Mathematics for Engineers and Physicists, 2 ed. By I. S. Sokolnikoff and E. S. Sokolnikoff. McGraw-Hill Book Co., New York and London, 1941. 587 pp., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, \$4.50.

The purpose of this book is to give students of engineering and other applied sciences a bird's-eye view of those mathematical topics beyond the elementary calculus which are indispensable in the study of physical sciences. Underlying principles are emphasized in order to provide an introduction to advanced mathematical treatises. The new edition has been considerably revised and enlarged.

Municipal Affairs. By E. W. Steel. International Textbook Co., Scranton (Pa.), 1941. 389 pp., diagrs., charts, tables, $8^1/_2 \times 5$ in., cloth, \$3.50.

Intended both as a textbook for college students and a source of information for those interested in municipal affairs, this book covers two fields. The first section is devoted to the development and forms of municipal government and its relation to state and federal authority. Administrative principles, including discussions of departmental work, city financing methods, and so on, are discussed in the latter part of the book.

Railroadians of America, New York, Book No. 3. Apply to W. A. Lucas, Editor and Chairman, Publication Committee, Railroadians of America, 56 Tuxedo Ave., Hawthorne, N. J., 1941. 128 pp., illus., diagrs., charts, tables, maps, $11 \times 7^1/_2$ in., paper, \$2.50.

The present volume of this series presents an illustrated record of the motive power and growth of the Delaware and Hudson Railroad. Originally printed in two sections by the Delaware and Hudson Railroad Corporation, additional material has been included to bring the information up to date.

(The) Reference Library of the Welding Research Council, Section I, Classified Library Catalogue, June, 1941. Published by Institute of Welding, 2 Buckingham Palace Gardens, London, S.W.1., England. 136 pp., $8^1/_2 \times 5^1/_2$ in., paper, 2*s*.

The major part of this publication is devoted to a catalogue of the reference library of the Welding Research Council, containing both author and subject entries in one alphabetical list. Additional information concerning the organization, staff, services, and publications of the Institute of Welding is also included.

Reinforced Concrete, Theory and Design. By John Edward Kirkham. Ann Arbor (Mich.), Edwards Brothers, Inc., 1941. 428 pp., tables, diagrs., charts, 9×6 in., cloth.

The author has presented the fundamental theory in such a manner that reinforced concrete beams, slabs, and columns can be quickly designated by direct application of simple mechanics without the use of numerous curves and tables. The book is practically a new presentation of the subject in that, while the mechanics involved is distinctly emphasized, the author has endeavored to parallel general usage sufficiently to harmonize the work with present concepts.

Sanitary Engineering. By H. G. Payrow. International Textbook Co., Scranton (Pa.), 1941. 483 pp., illus., diagrs., charts, tables, $8^1/_2 \times 5$ in., fabrikoid, \$4.

In preparing this work the author has endeavored to supply a concise textbook covering the general field of sanitary engineering for civil and chemical engineers. The fundamentals of water supply and purification and of sewerage and sewage treatment are comprehensively covered with the help of many tables and practical examples. Hydrology and other related topics, new types of equipment, and the application of recent developments such as air conditioning are included.

Strength of Metals Under Combined Stresses. By M. Gensamer. American Society for Metals, Cleveland, 1941. 106 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, \$2.

A course of lectures presented to members of the American Society for Metals in 1940 is given in this work. The lectures set forth the principles that may be used as guides in predicting the resistance to deformation and relative ductility of metals under complicated conditions of loading from the results of tests made under controlled and simpler conditions.

(The) Testing and Inspection of Engineering Materials. By H. E. Davis, G. E. Troxell and C. T. Wiskocil. Preliminary edition for Engineering Defense Training Courses. McGraw-Hill Book Co., New York and London, 1941. 372 pp., illus., diagrs., charts, tables, 10×7 in., cloth, \$3.50.

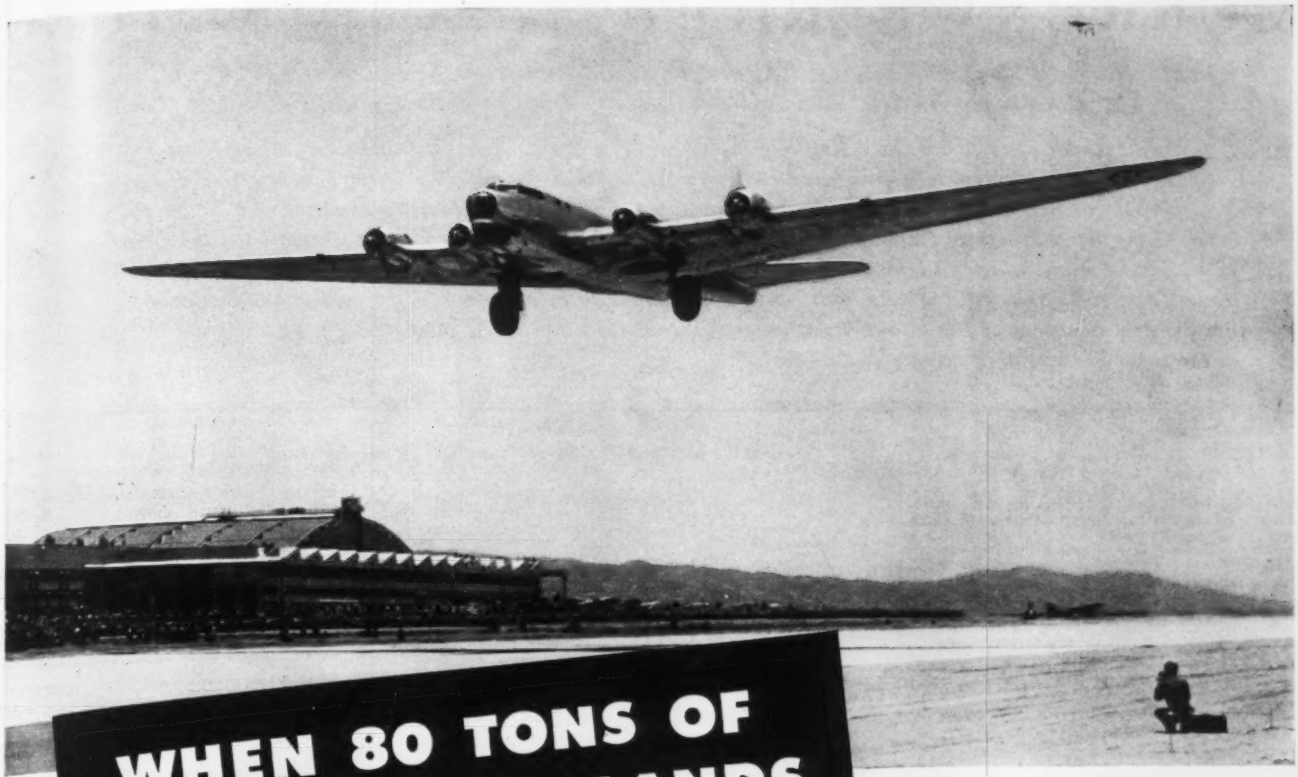
In view of the increasing importance of quality control in production and its dependence upon tests and inspection, it is the aim of the authors to provide in this book a general treatment of the problems of testing, with specific reference to the mechanical testing of engineering materials, and to establish the principles for the inspection of these materials. Methods of conducting common tests, applicable to most ordinary apparatus, are described in the second section of the book.

Theodore von Kármán Anniversary Volume, Contributions to Applied Mechanics and Related Subjects, by the Friends of Theodore von Kármán on his Sixtieth Birthday. Edited and published by California Institute of Technology, Pasadena, Calif., 1941. 357 pp., illus., diagrs., charts, tables, $11 \times 8^1/_2$ in., cloth, manifold copy, \$3.75.

Twenty-six papers contributed by outstanding workers in the field of applied mechanics are presented in this volume commemorating the sixtieth birthday of Theodore von Kármán. A brief biographical and appreciatory sketch and a bibliography of von Kármán's published works are included.

Through Engineering Eyes, Science Selections from Literature. By A. R. Cullimore, re-edited by F. A. Grammer and J. H. Pitman. Pitman Publishing Corp., New York and Chicago, 1941. 166 pp., illus., $7^1/_2 \times 5^1/_2$ in., linen, \$1.

Presented with the aim of "picturing the development of science and engineering," this small volume consists of selections from a variety of books, ancient and modern.



WHEN 80 TONS OF BOMBER LANDS

First take-off of world's largest bomber—the Douglas XB-19—from newly completed concrete runway at Clover Field, Santa Monica, California.

–what happens to the runway pavement?

Properly designed concrete runways can carry any weight of plane

Proved methods of design today enable engineers to design concrete pavements *as accurately for an 80,000-lb. bomber wheel load as for a 9,000-lb. highway wheel load.*

These methods, coupled with experience from the highway field, mean that adequate yet economical runways can be designed for any anticipated weight and volume of plane traffic. For equal load-carrying capacity at major airports, concrete runways will have *lowest first cost*—with neither expensive over-design nor wasteful under-design.

Important Safety Advantages, Too!

Even the slightest runway defect is a potentially serious matter with today's "hot" planes, intensive air operations and heavy emergency take-off loads. Concrete in addition to its all-weather load capacity assures adequate frictional resistance for braking . . . good light reflection for night landing . . . freedom from dangerous loose particles on runways.

For safety and economy, specify concrete for major airports.

●

PORTLAND CEMENT ASSOCIATION
Dept. 1-13, 33 W. Grand Ave., Chicago, Ill.

A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

CURRENT PERIODICAL LITERATURE

Abstracts of Articles on Civil Engineering Subjects from Publications (Except Those of the American Society of Civil Engineers) in this Country and Foreign Lands

Selected items for the current Civil Engineering Group of the Engineering Index Service, 29 West 39th Street, New York, N.Y. Every article indexed is on file in The Engineering Societies Library, one of the leading technical libraries of the world. Some 2,000 technical publications from 40 countries in 20 languages are received by the Library and are read, abstracted, and indexed by trained engineers. With the information given in the items which follow, you may obtain the article from your own file, from your local library, or direct from the publisher. Photoprints will be supplied by this library at the cost of reproduction, 25 cents per page to members of the Founder Societies (30 cents to all others), plus postage, or technical translations of the complete text may be obtained at cost.

BRIDGES

Cableways. Army Tries Out Cableway Bridges. *Eng. News-Rec.*, vol. 127, no. 15, Oct. 9, 1941, pp. 491–492. Details of new design consisting of welded tubular steel towers, cable and anchorage systems which can be stowed on two trucks and erected in 3 hours and can transport fifteen 13-ton vehicles per hour in slings suspended from cableway carriage; entire main span cable is lowered and raised when handling loads; useful for advance units of motorized forces; eliminates difficulties of steep banks and swift flowing water that restrict use of pontoons.

Cantilever. New Mississippi Combined Rail and Road Bridge. *Ry. Gaz.*, vol. 75, no. 14, Oct. 3 1941, pp. 323–324. Cantilever bridge erected near Baton Rouge by balancing, without falsework, on piers built upon caissons sunk 180 ft below low water level; bridge carries railway between main trusses, centers of which are 32 ft apart, and 20-ft one-way roadway is cantilevered out on each side of five main spans; latter consist of two 490-ft anchor spans (one on each bank of river); two 848-ft cantilever spans, each containing 396-ft suspended section; and central 650-ft anchor span between them.

Concrete, Brazil. Prova de carga da ponte da Cidade Jardim sobre o canal do rio Pinheiros, P. Franco Rocha. Sao Paulo, Brazil. *Departamento de Estradas de Rodagem—Boletim*, vol. 7, no. 23, Apr. 1941, pp. 207–219. Loading test of Cidade Jardim concrete bridge across canal of Pinheiros River; central span 48 m and approach spans 20 m each; description of tests made with two rollers, weighing 15 tons and 15.5 tons; instruments and measurement of deflection; theoretical determination of deformation; test results indicate high factor of safety.

Concrete, Chicago. Place High Quality Concrete in Bridges of Chicago's Outer Drive. *Concrete*, vol. 49, no. 8, Aug. 1941, pp. 2–3 and 35. Three bridge and grade-separation structures which form part of construction features of Chicago's 100-ft Outer Drive described; grade separation at Fullerton Avenue; lagoon Bridge at Fullerton Parkway; Belmont Avenue grade-separation structure, rigid-frame type of reinforced concrete design.

Concrete Frame, Minnesota. Minnesota's Rigid-Frame Bridges Are Part of Big Program. *Concrete*, vol. 49, no. 9, Sept. 1941, pp. 2–3. Notes on bridge construction program being carried out by Minnesota Department of Highways; general dimensions of rigid-frame design are given in cross-section drawing; construction procedure described.

Highway, Brazil. A nova ponte do Cubatao, G. de Barros Leite. Sao Paulo, Brazil. *Departamento de Estradas de Rodagem—Boletim*, vol. 7, no. 23, Apr. 1941, pp. 161–169, and supp. plate. New bridge over Cubatao River, on highway between Santos and Sao Paulo; concrete arch structure with span 76 m and rise 14.10 m; calculation of design; construction of steel arch and members; concreting.

Piers, Welding. Pit River Bridge, H. W. Young. *Welding Engr.*, vol. 26, no. 8, Aug. 1941, pp. 27–29. Pit River Bridge will be highest double-deck bridge in world; total of 10,930,000 lb of reinforcing steel required for pier; for this butt welding of reinforcing bars to make them continuous requires total of over 8,000 welds; welding problems discussed.

Railroad, Brazil. Prova de Carga de Ponte de Airosa Galvao, P. Franco Rocha. Sao Paulo, Brazil. *Instituto de Pesquisas Tecnologicas—Boletim*, no. 28, Sept. 1941, 46 pp. Loading test of concrete arch bridge of Paulista Railroad across Tlete River, near Airosa Galvao station; nine spans, each of 37-m and 6-m rise; description of test train; load distribution; recording apparatus; time and temperature for different tests; theoretical determination of deformations; correction hypotheses; comparison of actual results with theoretical.

Suspension, Australia. Suspension Bridge Anchored in Clay, M. G. Dempster. *Eng. News-Rec.*, vol. 127, no. 15, Oct. 9, 1941, p. 485. New bridge, near Victoria, Australia, is about $^{1}/_{4}$ mile long and is designed for light loads; illustrated description of methods used in building cellular anchorages in clay foundation.

Suspension, Painting. Safe and Efficient Pipeline Bridge Painting, J. A. Martin. *Gas Age*, vol. 88, no. 9, Oct. 23, 1941, pp. 47–48. Description of special equipment and facilities used in priming and painting wind guy rods, suspender rods, and main line of 12-in. pipe line on suspension bridge of Lone Star Gas Co., over Brazos River, near Waco, Tex.; bridge measures 1,320 ft from anchor to anchor and 520 ft from tower to tower; 17 gal of red primer coating and 29 gal of aluminum paint were required; 1,200-ft galvanized iron, $1^{1}/_{2}$-in. main cable, and 1,150 ft of 1-in. cable did not require painting.

Suspension, Wind Resistance. Suspension Bridges and Wind-Resistance. *Eng. News-Rec.*, vol. 127, no. 17, Oct. 23, 1941, pp. 565–568. Use of bracing, stay systems, weight, and proper stiffening members as exemplified in Roeblings 1,057-ft span of Cincinnati Bridge built in 1867 and still in service; measures suggested to solve problem of aerodynamic stability in suspension bridges include decrease in pressure areas or provision of additional bracing, venting floors and curbs, and snubbed check stays; proposed design using triangulated suspender rope system to offer damping characteristics of high order is also outlined.

BUILDINGS

Air Conditioning, Sanatoriums. Making Arizona Climate in Illinois. *Sheet Metal Worker*, vol. 32, no. 9, Sept. 1941, pp. 62, 64, 66, and 76. Details of air-conditioning system, installed at Winfield Sanatorium, Winfield, Ill., for treatment of tuberculous patients, designed to maintain uniformly cool conditions indoors at all times; cold well water handles 25-ton cooling load in duct system comprising 15,000 lb of 16- and 24-gage copper-bearing galvanized sheets.

Algona, Iowa. Algona, Diesel Plant Moves to New Site, G. C. Boyer. *Power Plant Eng.*, vol. 45, no. 11, Nov. 1941, pp. 82–84. Construction of new building and rehabilitation of existing equipment described; most striking feature of building is absence of beams and columns usually required for supporting operating floor in engine room; details given of engine room arrangement, cooling water system, and switchgear.

Anti-Aircraft Protection. Indoor Shelters. *Surveyor*, vol. 99, no. 2570, Apr. 25, 1941, pp. 283–285. General characteristics of design and test of air-raid shelters intended for erection indoors; data for guidance of designers for steel shelters and for shelters consisting of pre-cast reinforced concrete units.

Anti-Aircraft Protection, New York City. Building Protection for New York City in Case of Aerial Bombardment, C. W. Campbell. *Am. Ga. J.*, vol. 155, no. 4, Oct. 1941, pp. 39–43. Outline of activities of Defense and Disaster Control Department of Housing and Buildings; survey of available personnel; study of problem aided by obtaining information from federal and other sources, as to what aerial bombardment means and what its effects may be; eight classifications of buildings discussed; shelter facilities. Before Maryland Utilities Assn.

Apartment Houses. Sixteen Stories of Concrete—Six of Steel. *Eng. News-Rec.*, vol. 127, no. 13, Sept. 25, 1941, pp. 419–422. Discussion of design problems of 22-story apartment house combining reinforced-concrete structure for 16 floors and six top floors framed in steel, being constructed at 40 Central Park South, New York City; effective use of rigid-frame principle; live-load reductions; required area for columns secured by using irregular shapes concealed in closets and partitions; construction at record speed of two floors per 35-hour week; setback problems; construction procedure.

Concrete. War-Time Buildings. *Concrete & Constr. Eng.*, vol. 36, no. 9, Sept. 1941, pp. 365–274. Outline of British war-time system of construction of single-story buildings consisting essentially of adaptation of 3-pin portal frames in pre-cast reinforced concrete units for buildings covering area of 6,060 sq ft; design of shadowless buildings; sequence of operations; cost and reinforcement data.

Concrete, Design. Work on Aviation Instruments Calls for Building of Unusual Design. *Eng. News-Rec.*, vol. 127, no. 17, Oct. 23, 1941, pp. 593–595. Buildings of unusual type to be built at army air fields of major importance have been designed to provide ideal conditions, as nearly as may be, for precise adjustment of aviation instruments; special features include no windows, heavy insulation throughout, door openings in series as in airlocks, emphasis on air conditioning, and longitudinal separation into two bays by concrete wall in which there are no openings; data on two such buildings now under construction, which are given in article.

Hospitals, Bethesda, Md. Precast Facing Used on Navy Hospital, H. C. Fischer. *Eng. News-Rec.*, vol. 127, no. 17, Oct. 23, 1941, pp. 576–579. Buildings housing medical schools and hospitals for Navy Department at Bethesda, Md., have walls faced with 400,000 sq ft of pre-cast exposed aggregate concrete panels in place of usual natural stone; some buildings are 3- and 4-story concrete frames with free standing walls and there is 20-story structural steel tower building with curtain type walls; back-up is brick and walls are furred with tile on inside; some 500 different shapes of panels are used.

Requisitioning. Requisitioned Premises, C. W. Craske. *Surveyor*, vol. 99, nos. 2567, and 2568, Apr. 4, 1941, pp. 235–236, and Apr. 11, pp. 251–252. Discussion of problems attending government requisitioning of buildings for war-time use by requisition or by offer and acceptance; method of inspection and selection to determine whether or not building is suitable for war-time emergency use; special requirements concerning cooking and washing facilities, plumbing, and lighting; notes on storage and inventories.

Welded Steel Churches. Unique Design in Welded Steel Features New Cleveland Church. *Welding J.*, vol. 20, no. 8, Aug. 1941, pp. 540–541. Brief description and architect's illustration of all-welded steel frame church building; gable frame roof has pitch of 45 deg, and entire structure is free standing; use of bent channels and plate arc welded to form haunch section of columns results in greatest possible rigidity.

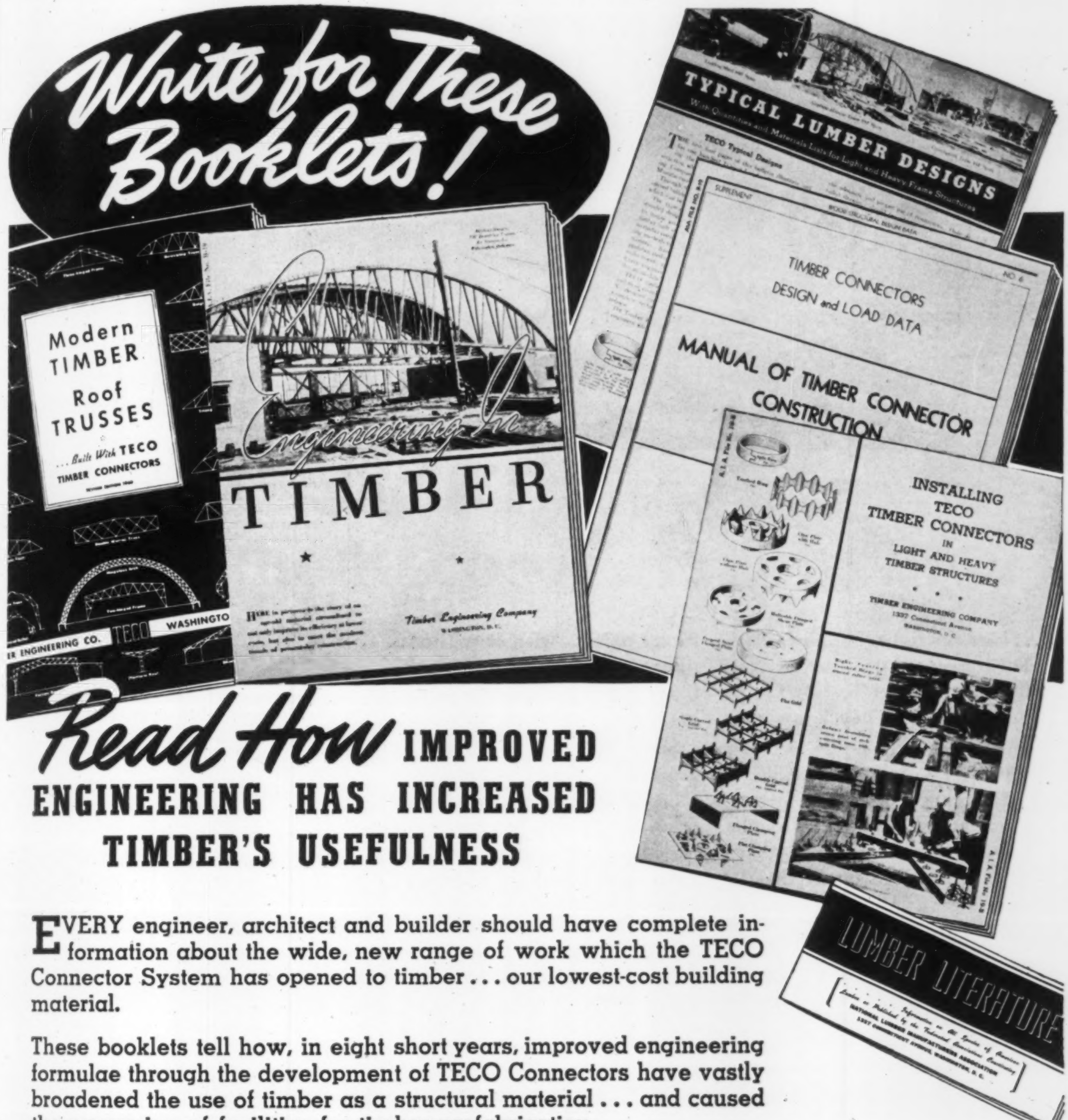
CITY AND REGIONAL PLANNING

Analysis. Analysis of Purposes of Land Use Survey, H. E. Young and R. B. Filley. *Planners J.*, vol. 7, no. 3, July–Sept. 1941, pp. 3–10. Article is devoted largely to character of information to be obtained in land-use survey and embraces determination of present land-use pattern, intensity of use, quality of use, direction, rate, and nature of trends, and data for special use.

CONCRETE

Aggregates, Analysis. Die Ermittlung feiner Stoffe im Betonzuschlag, K. Walz. *Zement*, vol. 29, no. 34, Aug. 22, 1940, pp. 435–437. Determination of fine constituents in concrete aggregates; discussion of test methods heretofore employed, which, it is claimed, have not been altogether successful; description of simplified sedimentation method employing aerometer.

Aggregates, Grading. Fine Aggregate Grading, D. A. Abrams. *Am. Ry. Eng. Assn.—Bul.*, vol. 43, no. 425, June–July 1941, pp. 24–31. Discussion of Report of Joint Committee on Standard Specifications for Concrete and Reinforced Concrete fineness modulus of aggregate; definition of fineness modulus; fineness modulus


Write for These Booklets!
Modern TIMBER Roof TRUSSES ... Built With TECO TIMBER CONNECTORS
TECO
TIMBER ENGINEERING CO. WASHINGTON
Engineering In TIMBER
Timber Engineering Company
TYPICAL LUMBER DESIGNS
TIMBER CONNECTORS DESIGN and LOAD DATA
MANUAL OF TIMBER CONNECTOR CONSTRUCTION
INSTALLING TECO TIMBER CONNECTORS IN LIGHT AND HEAVY TIMBER STRUCTURES
TIMBER ENGINEERING COMPANY 1337 Connecticut Avenue Washington, D. C.
LUMBER LITERATURE

Read How IMPROVED ENGINEERING HAS INCREASED TIMBER'S USEFULNESS

EVERY engineer, architect and builder should have complete information about the wide, new range of work which the TECO Connector System has opened to timber ... our lowest-cost building material.

These booklets tell how, in eight short years, improved engineering formulae through the development of TECO Connectors have vastly broadened the use of timber as a structural material ... and caused the expansion of facilities for timber prefabrication.

YOU SHOULD READ THESE BOOKLETS. THEY ARE YOURS FOR THE ASKING ... JUST MAIL THE COUPON!

USE THIS COUPON

TIMBER ENGINEERING COMPANY, Inc.

Dept. R-1, 1337 Connecticut Avenue
Washington, D. C.

Timber Engineering Company, Inc., Dept. R-1
1337 Connecticut Avenue, Washington, D. C.

GENTLEMEN: Please send me without cost or obligation:

☐ Complete information on the TECO Connector System of construction.

☐ "Lumber Literature". (Catalog of all Lumber Literature)

Individual ....
Firm ....
Street ....
City.................... State....................

raider or reaper...

.. it's Arkwright across the board. For draftsmen know that the quality of Arkwright Tracing Cloths never varies. They know that Arkwright standards stand .. in war as well as in peace!

Smoothness of surface, permanent transparency, ability to take erasures without smudging–that's what Arkwright quality has always meant. And that's what it means today .. what it will continue to mean. What's more, delivery is as prompt, as dependable as ever.

Since there are four brands of Arkwright Tracing Cloths, one is bound to be suited to your type of work. So why not write for free samples – and new catalog? Arkwright Finishing Company, Providence, Rhode Island.

Arkwright TRACING CLOTHS

"AMERICA'S OLDEST AND FINEST"

Sold by Leading Drawing Material Dealers Everywhere

on "coarser-than" grading; methods of computing fineness modulus; sieve analysis curves; permissible range in fineness modulus of sand; grading limits for fine aggregate; interpretation of tolerance clause; shorthand signs in specifications.

ALKALI EFFECT. Effect of Alkalies on Concrete, G. Ash. *Pit & Quarry*, vol. 34, no. 4, Oct. 1941, pp. 40–42. Review of literature dealing with problem; special attention is directed to possible causes of cracking on Parker Dam, concrete-arch structure spanning Colorado River 155 miles below Boulder Dam; present author does not believe that alkali excess of few tenths of one per cent can chemically affect siliceous ingredients of aggregates; it is presumed that not all types of rock used in Parker Dam aggregates were fit to be used. Bibliography.

CONSTRUCTION, FORMS. Cantilever Forms Preferred at Mahoning, K. C. Cox. *Eng. News-Rec.*, vol. 127, no. 17, Oct. 23, 1941, pp. 554–556. Description of practical cantilever form used on Mahoning Dam, Dayton, Pa.; 4-in. tongue-and-groove vertical sheathing used with rolled steel sections for horizontal and vertical wales; form rods and stud bolts made of high tensile steel; pouring rate of 2 1/2 ft per hour assured; feature of design is use of member that supports forms while ties are removed, thus minimizing time that raising crew is at form.

CONSTRUCTION, LIGHT-WEIGHT. Lightweight Concrete Construction. *South African Engr. & Elec. Rev.*, vol. 32, no. 281, Sept. 1941, pp. 19 and 21. New type of light-weight concrete construction has been evolved on Witwatersrand and is now being used in building of portable huts for South African Defense Force; material employed is patent light-weight concrete which does away with use of corrugated iron and permits substantial reduction in quantity of timber required.

CONSTRUCTION, PREFABRICATED. Two Men and An Idea. *Rock Products*, vol. 44, no. 11, Nov. 1941, pp. 64, 66, and 68. Pre-cast concrete joists, stairs, stringers, sills, beams, and slabs made by new production methods, devised by C. D. Walles and F. J. Bageman; first application of Walles-Bageman idea of floor construction was New Dracher Hotel in West Los Angeles, Calif., where pre-cast joints, beams, and slabs replaced original plans for wooden floor; notes on later projects.

CURING. Find Carbon Dioxide Gas Under Pressure an Efficient Curing Agent for Cast Stone, J. Weber and R. Matthei. *Concrete*, vol. 49, no. 7, July 1941, pp. 33–34. Notes on results of various tests to determine efficiency of carbon dioxide as curing agent for speed curing of cast stone and other concrete products conducted in laboratory of Liquid Carbonic Corporation; results indicate that cast-stone slabs treated with carbon dioxide, after initial set of portland cement has taken place, show surface hardness equivalent to eight days curing under regular conditions.

DEFORMATION. As deformacoes do concreto e a teoria de Freyssinet, T. van Langendonck. Sao Paulo, Brazil. *Departamento de Estradas de Rodagem—Boletim*, vol. 7, nos. 22, 23, and 24, Jan. 1941, pp. 1–29; Apr., pp. 170–195; and July, pp. 306–325. Concrete deformations and Freyssinet theory; mathematical study for purpose of explaining theory; comparison of results of principal tests; deformations due to setting, to variations in moisture content, to variations in temperature, and to variations of stress produced by mechanical agencies. Bibliography.

DESIGN. Minimum-Steel Graphs for Bending and Compression, P. Massarik. *Concrete & Constr. Eng.*, vol. 36, no. 9, Sept. 1941, pp. 353–364. Construction of graphical charts for computing most economical areas of tension and compression steel for any rectangular section under bending and compression or for any rectangular section in simple bending where compression steel is required; use of graphs; examples for simple bending; derivation of curves.

DISINTEGRATION. Concrete Failure Attributed to Aggregate of Low Thermal Coefficient, J. C. Pearson. *Am. Concrete Inst.—J.*, vol. 13, no. 1, Sept. 1941, pp. 29–34. Report on causes of rapid failure of some cast-stone steps in winter of 1937–1938, containing evidence that low thermal coefficient of dolomitic marble aggregate was primarily responsible for trouble.

DRYDOCKS, CONSTRUCTION. Belt Conveyers and Traveling Bridge. *Construction Methods*, vol. 23, no. 9, Sept. 1941, pp. 52–53, 114–115, and 117. Description of large-scale system of belt conveyors delivering to traveling bridge spanning job site, used to transport concrete from central mixing plant to 135 by 720-ft area covered by drydock, being built at U.S. Navy's destroyer base in San Diego, Calif.; details of mixing plants; preventing belt overload.

HOUSING, LATIN AMERICA. Latin America Favors Concrete House, G. W. Hoffmann. *Rock Products*, vol. 44, no. 11, Nov. 1941, pp. 61–62 and 68. General commentary, citing trends in use of reinforced concrete and hollow brick; Buenos Aires and Sao Paulo prefer clay bricks to modern concrete blocks; opportunity exists for popularizing light-weight concrete blocks, utilizing resources of pumice (volcanic ash) for light-weight aggregate.

MIXERS. Versuche ueber die Durchmischung des Betons in Freifallmischern, F. Kaufmann. *Zement*, vol. 29, nos. 29, 30, and 31, July 18, 1940, pp. 369–372; July 25, pp. 381–385; and Aug. 1, pp. 393–394. Tests on mixing in concrete gravity mixers; results of tests on mixers employed in construction of German superhighway; recommendations for guarantee testing of minimum output of mixer.

MIXING. Concrete Produced Under Precise Control at Mixing Plants Serving Saugatuck Dam, W. F. Trauffer. *Pit & Quarry*, vol. 34, no. 4, Oct. 1941, pp. 67–69 and 73. Notes on seventh and largest dam in chain of collecting reservoirs of Bridgeport Hydraulic Company, which supplies water to Bridgeport, Conn., and vicinity; dam will be 120 ft high above bedrock and 1,100 ft long; subsidiary dam, aqueduct, and two concrete lined tunnels; more than 90,000 cu yd of concrete required is being made at two central mixing plants; details of equipment and mixing practice.

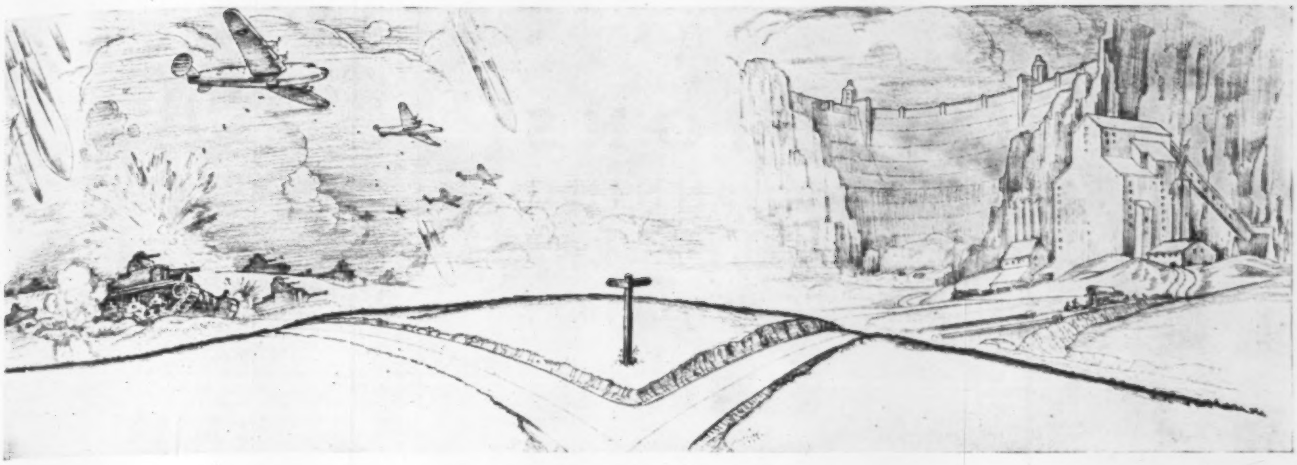
REINFORCEMENT, BONDS. Bond Stress in Concrete Pull-Out Specimens, D. Watstein. *Am. Concrete Inst.—J.*, vol. 13, no. 1, Sept. 1941, pp. 37–50. Report on experimental study of distribution of bond stress in pull-out specimens, containing round deformed and plain bars 3/4 in. in diameter; comparison of observed and computed over-all elongations in solid and perforated pull-out specimens for corresponding loads.

WALLS. Pneumatically Placed Concrete for Walls of Industrial Plants, J. Q. A. Greene. *Eng. News-Rec.*, vol. 127, no. 13, Sept. 25, 1941, pp. 435–436. Discussion of recent practice of construction of 2-in. thick reinforced shotcrete walls for single-story steel frame national defense industrial buildings; design details for wall of pneumatically placed concrete; placing procedure.

DAMS

EARTH, CUTOFFS. Concrete Core Wall at Merriman Dam. *Eng. News-Rec.*, vol. 127, no. 13, Sept. 25, 1941, pp. 426–430. Construction of cutoff wall at Merriman Dam on New York City's Delaware Aqueduct with 20 caissons, some as much as 180 ft high, sunk to rock through boulders and water-bearing strata; design and assembly of caissons; concreting set-up; excavation and sinking; materials encountered in caisson sinking; compressed air work; underpinning; grouting; connection between caissons.

MASONRY, SUDAN. Gebal Aulia Dam, A. G. Vaughan-Lee. *Instn. Civ. Engrs.—J.*, vol 16,



We Shall Try to Keep the Record Straight

Do not picture the explosives manufacturer as one who simply presses a button and, presto! peacetime commercial explosives production is transformed into powder for shells and bombs.

To begin with, commercial explosives manufacturing facilities are not suitable for munitions production. Dynamite is not used in bombs and shells. TNT is not made in a dynamite plant. Complete new plants must be erected on a gigantic scale.

Peacetime explosives are essentials of constructive effort, so much so that Government recognizes their necessity in construction projects, in mining, in quarrying and other primary enterprises. Continued production of commercial explosives is important in maintaining the economy.

In the second place, the making of explosives is only one of the uses to which chemicals are put by an industry such as "Atlas Powder." Other Atlas chemical products—finishes, coated fabrics, activated carbons, synthetic chemicals, processing aids—are fundamental products indispensable to many phases of industry.

War demands come first—and Atlas has enlisted for the duration.

What Atlas has to offer is "knowledge" in the art and science of explosives making—experience, technique, laboratory foresight—the capacity to organize and train for large-scale production. Atlas is now operating for the Government, Government-owned plants such as those at Ravenna, Ohio, and Weldon Spring, Mo. In these plants, we are contributing our competency and service on a fixed fee basis.

But with all our involvement in the war effort, we are doing our level best and meeting the demands of commercial production. As in any other industry, problems are tough and plentiful. Ingenuity, elbow grease and patience are great aids when producer and customer cooperate—it is amazing how much can be accomplished—and we shall try to keep the record straight.

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington, Del. • Offices in principal cities • Cable Address—Atpowco

FOUNDATIONS
PRETEST UNDERPINNING
TUBA STEEL CYLINDERS
MASS CONCRETE CONSTRUCTION

SPENCER, WHITE & PRENTIS, INC.
NEW YORK, N. Y.

Polaroid*...
Photoelastic
Polariscope
for Stress Determination

To the machine designer, photoelastic stress analysis is not only of value in the verification of calculations based on theoretical solutions, but also in the solution of problems where theoretical analysis is not available. Where weight and space must be conserved actual stress distribution is more important than stress indicated by theoretical analysis.

In the new model polariscopes of 4¼" and 6¼" clear aperture, the parallel beam is collected by a rear element and condensed through a three component lens of the Cooke system. In the new larger units (8¼" and 10" aperture) a four component lens of the Omnar system is used. In both cases, *the image is sharp throughout the field, free of aberration, astigmatism and distortion.*

Literature of new model polariscope now available

POLARIZING INSTRUMENT CO.
630 Fifth Ave., New York, N. Y.

*T. M. Reg. U.S. Pat. Off. by Polaroid Corporation

"COMMERCIAL"
METHODS

of tunneling—described in our booklet—every engineer interested in tunnel design should have it—Drop us a card.

COMMERCIAL
TUNNEL LINERS

THE COMMERCIAL SHEARING AND STAMPING CO.
YOUNGSTOWN, OHIO

no. 7, June 1941, pp. 326–350. Design and construction of masonry and earth-fill dam across White Nile, 26 miles above Khartoum, Sudan having total length of 16,404 ft, of which 5,554 ft is masonry structure about 60 ft maximum height, comprising sluice dam 1,489 ft long; details of solid dam, sluice dam; training-walls and aprons; lock guide-walls and fish-ladder; embankment dam; steelwork and mechanical equipment; operation of reservoir; cost about 2,000,000 Egyptian pounds.

Reservoirs, Silt. Method of Estimating Maximum Possible Silt Deposit Upstream of Dams Constructed in Silt-Carrying Rivers, A. A. Ahmed. *Instn. Civ. Engrs.—J.*, vol. 16, no. 7, June 1941, pp. 399–403. Solution for determination of boundary conditions enabling estimation of maximum quantity of silt that can possibly be deposited under given hydraulic conditions, based upon assumption that natural silt-carrying rivers are, to certain extent, self-correcting in matter of silting and scour.

FLOOD CONTROL

Los Angeles, Calif. Los Angeles Flood Control Project, N. A. Matthias. *Military Engr.*, vol. 33, no. 191, Sept. 1941, pp. 382–388. Review of development of flood control system of Los Angeles district of Southern California; stream systems; possible flood damage; flood control basins in existing project; type of improvements for Los Angeles County; types of works; water conservation; benefits to be obtained.

Ohio. Flood of August 1935 in Muskingum River Basin, Ohio, C. V. Youngquist and W. B. Langbein. *U. S. Geol. Survey—Water-Supply Paper No. 869*, 1941, 116 pp., 40 cents. Report presents comprehensive factual information on stage and discharge at 27 points in basin and flood-crest stage at 193 points together with pertinent data on previous floods, records for which on main river extend back with decreasing completeness to 1847.

FOUNDATIONS

Bridge Piers, Erosion. Erosion autour de piles de ponts en rivière, L. J. Tison. *Annales des Travaux Publics de Belgique*, vol. 41, no. 6, Dec. 1940, pp. 813–871. Theoretical discussion of erosion of stream bed around bridge piers, also results of observations on effect of relative location and shape of piers on rate and extent of erosion; effect of spacing of piers; measures for prevention of erosion. Bibliography. (Abstract in Flemish.)

Cofferdams, Design. Grundsaetzliches ueber die Berechnung von doppelten Spundwaenden (Fangedaemmen), E. Jacoby. *Bautechnik*, vol. 19, no. 22, May 23, 1941, pp. 240–243. Theoretical mathematical discussion of design of double bulkheads forming cofferdams.

Soils, Consolidation. Consolidation Settlement Under Rectangular Load Distribution, M. A. Biot. *J. Applied Physics*, vol. 12, no. 5, May 1941, pp. 426–430 Author's general theory is applied to calculation of settlement through consolidation of soil loaded uniformly on infinite strip of constant width with particular reference to nature of settlement at edge of loaded area; solution is obtained by first calculating settlement produced by suddenly applied load with sinusoidal distribution.

Soils, Consolidation. Stromruettelverfahren, W. Bernatzik. *Bautechnik*, vol. 19, no. 6, Feb. 7, 1941, pp. 67–70. Experimental study of author's original hydraulic process for compacting of sandy soils, aiming to reproduce effect of Steuerman vibroflotation process; compaction is produced by water stream pulsating through rubber or canvas hose which is in contact with sand mass to be compacted.

HYDRAULIC ENGINEERING

Flow of Water, Open Channels. Wasserspiegelberechnung von Kanaelen bei gleichmaessiger Bewegung und veraenderlicher Wassermenge, P. W. Werner. *Bautechnik*, vol. 19, no. 23, May 30, 1941, pp. 251–252. Theoretical mathematical discussion of methods of computing surface curves of canals of variable discharge at uniform flow.

Review. Review of Fundamentals of Hydraulics, R. W. Machen. *Petroleum Engr.*, vol. 12, no. 13, Sept. 1941, pp. 126, 128, and 130. Use of weirs in gasoline plants and refineries to measure fluid flow makes it important for plant operator to understand few basic principles of hydraulics; fundamental facts; hydrostatic or "static head"; flow of water through orifices; weir measurement.

Water-Distribution Systems. Hydraulic nvestigation of Water Distribution Systems in Field and Office, G. M. Fair. *New England Water Works Assn.—J.*, vol. 55, no. 2, June 1941, pp. 271–306, supp. plate. Discussion of methods of analysis; types of distribution systems; required capacity and pressure of distribution systems; hydrant flow calculations; office studies of distribution systems; method of sections; Hardy Cross method; method of equivalent pipes; service storage; Hardy Cross method of balancing networks.

IRRIGATION

Canals, Lining. Silt-Lining Canal. *Western Construction News*, vol. 16, no. 9, Sept. 1941, p.

273. Reduction of seepage of water from main canal of Vale reclaiming project in Oregon by hydraulicing of silt to canal at 50 cents per cu yd, where it forms relatively impervious lining.

CANALS, SILT CONTROL. Proportional Silt Distribution at Heads of Canals and Distributaries in Sind, S. S. H. S. Kahai and M. G. Hiranandani. *Sind Pub. Works Dept.—Tech. Paper No. 5*, 1941, 26 pp., supp. plates. Price Rs-4. Results of survey of silting conditions in irrigation canals of Sind Province of India; results of model experiments on proportional distribution of silt showing how silt over certain size can be distributed as desired between different canal offtakes.

SUGAR CANE GROWING. Overhead Irrigation, H. R. Shaw. *Int. Sugar J.*, vol. 43, no. 513, Sept. 1941, pp. 268–269. Experiments at Waialua plantation described; permanent supply lines carried hydrants at 100-ft intervals; permanent piping was spiral weld, 12-gage steel with 22$^1/_2$-lb asbestos wrap with pipes 40 ft in length; pump (Allis-Chalmers) is capable of delivering 1,300 gal per min under pressure of 75 lb per sq in; operational costs; water conservation; growth of crop; harvest; etc. Before Hawaiian Sugar Technologists.

LAND RECLAMATION AND DRAINAGE

BUENOS AIRES. Desagues Pluviales de la Ciudad de Buenos Aires Canalizacion Cerrada del Arroyo "Teuco," R. Eiriz and M. Rosenfeld. *Boletin de Obras Sanitarias de la Nacion* vol. 5, no. 46 Apr. 1941, pp. 357–371. Rainwater drainage project of city of Buenos Aires; cut-and-cover canal of "Teuco" creek, principal outlet of second section of Riachuelo; details of project and bids on construction work.

BUENOS AIRES. Desagues Pluviales de la Ciudad de Buenos Aires—Obras del Contrato V: Zona Tribuatria del Riachuelo con Desague al Arroyo Cildanez, H. d'Agnillo. *Boletin de Obras Sanitarias de la Nacion*, vol. 5, no. 50, Aug. 1941, pp. 137–157. Rainwater drainage project of city of Buenos Aires; works of Contract V; Tributary zone of Riachuelo, with drainage into Cildanez creek; review of construction.

FLORIDA. Controlled Drainage in Northern Everglades of Florida. B. S. Clayton and L. A. Jones. *Agric. Eng.*, vol. 22, no. 8, Aug. 1941, pp. 287, 288, and 291. Description of drainage system of northern Everglades in Florida; maintenance of drainage ditches and pumping stations; removal of hyacinths; subsidence of soil in northern Everglades due to action of aerobic bacteria. Before Am. Soc. Agric. Engrs.

MATERIALS TESTING

CONCRETE. Influence of Vibration Consistency and Grading of Aggregate Upon Design of Concrete, G. W. Hutchinson. *Am. Concrete Instr.—J.*, vol. 13, no. 1, Sept. 1941, pp. 9–28. Report tests, made in connection with construction of Clayter Dam in Virginia, for determination of effect of various factors on strength and other properties of concrete; effect of consistency and water-cement ratio upon compressive strength; relation between compressive strength and fineness modulus of aggregate; variation in compressive strength and placeability with change in aggregate grading, etc.

DOMES AND SHELLS. Untersuchungen zur Erfassung des Biegungs-bzw. Beulungseinfluss bei Spannungsmessungen an nur einseitig zugaenglichen Schalenkonstruktionen, A. Dose, *Luftfahrtforschung*, vol. 18, no. 1 $^2/_3$, Mar. 29, 1941, pp. 95–101. Report from Focke Wulf Airplane Works of Bremen, Germany, outlining methods of practically eliminating entirely disturbing effects of bending and bulging during measurements of stress skin shell structures which are accessible on one side only, usually exterior surface; numerical examples.

RAILS. Rail Problems Get Attention in Three Important Studies. *Ry. Age*, vol. 111, no. 12, Sept. 20, 1941, pp. 449–453. Details on tests of corrosion in tunnels and of vertical stresses in web sections; causes and correction of corrugation analyzed. Abstracts of three papers compiled by members of American Railway Engineering Association: Many Corrosion Tests Made in Moffat Tunnel, A. E. Perlman; What Causes Rail Corrugation, H. H. Morgan; Field Tests Reveal Stresses in Rail Webs, A. N. Talbot.

ROOFING MATERIALS. Survey of Roofing Materials in North Central States, H. R. Snoke and L. J. Waldron. *U. S. Bur. Standards—Bldg. Matls. and Structures—Report BMS 75*, July 1, 1941, 21 pp. Survey of weathering qualities and extent of use of various roofing materials on dwellings in North Central States is described; photographs, illustrating type of weathering of roofing materials, and features of design and construction of roofs, are shown.

STANDARDS, UNITED STATES. Notes From National Bureau of Standards. *Franklin Inst.—J.*, vol. 232, no. 3, Sept. 1941, pp. 267–282. Fire Tests of Partitions; Thermal Expansion of Building Brick; Modulus of Rupture of Beams; Air Content of Fresh Concrete; Quantitative Determination of Fluorine in Organic Compounds; Microscopic Structure of Wool Fiber; Revised Simplified Practice Recommendation for Hospital Plumbing Fixtures; Table of Natural Logarithms.

STRENGTH OF MATERIALS. Strength of Materials (Pennsylvania State College Industrial Series), J. W. Breneman. McGraw-Hill Book Co., New York, 1941, 145 pp., illus., diagrs., charts, tables, $1.50. Simplified presentation of fundamentals of strength of materials; intended for student or apprentice with limited mathematical background, theoretical treatment is held to minimum; stress laid on application of principles to important practical problems common in industry. Eng. Soc. Lib., N.Y.

RAILROADS, STATIONS, AND TERMINALS

RAILROAD CROSSINGS, SIGNALS AND SIGNALING. Street Crossing Protection on Boston & Maine. *Ry. Signaling*, vol. 34, no. 9, Sept. 1941, pp. 480–483. Flashing light signals installed at 8 street crossings in Hoosick Falls, N.Y.; controls arranged for operation of signals when trains are operated in either direction on either track; control machine consists of cabinet with sheet metal face panel on which is illuminated track and signal diagram and row of control levers; signal equipment; signal lamps are rated at 11 v, 11 w, and are normally fed at 10 v a-c from transformer.

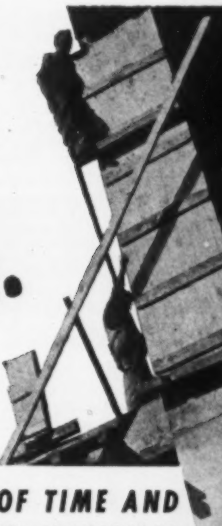
ROADS AND STREETS

BY-PASS. Massachusetts Builds By-Pass Around City of Lowell. *Eng. News-Rec.*, vol. 127, no. 13, Sept. 25, 1941, pp. 416–418. Report on construction of new 4$^1/_2$-mile six-lane divided by-pass road around Lowell, Mass., which is also link in new main highway from Boston metropolitan district to New Hampshire, built on 500-ft right-of-way; details of deck of typical bridge on new highway.

CONSTRUCTION. River Channel Makes Highway. *Western Construction News*, vol. 16, no. 9, Sept. 1941, pp. 261–263. Using 2$^1/_2$ million cu yd of dredged material resulting from deepening of Columbia River channel for construction of hydraulic embankment of relocated Columbia River Highway between Troutdale and Dodson; construction procedure; completing rough grade.

DRAINAGE. Nuevo Tipo de Sumideros en Obras de Desagues Pluviales, R. Bottinelli. *Boletin de Obras Sanitarias de la Nacion*, vol. 5, no. 50, Aug. 1941, pp. 129–136. New type of gutters in rain-water drainage works; by use of both horizontal and vertical screens, design is intended to give maximum flow facilities with least tendency to become stopped up with leaves or rubbish.

GERMANY. Die Verbesserung schlechter Orts durchfahrten, Westmeyer. *Bautechnik*, vol. 19 nos. 17/18 and 20/21, Apr. 18, 1941, pp. 189–192 and May 16, pp. 228–231. Review of modern German practice in improvement of thoroughfares



O.K. FIGURE IT!

ON THE BASIS OF TIME AND MONEY, MEN AND MATERIALS RICHMOND FORM-TYING METHODS BEAT "HOME-MADE" DEVICES.

The RICHMOND WAY is the money making way on concrete form work of any kind . . . .

Make sure the profit you figure on is the profit you get when doing concrete work. How? Use Richmond Form-Tying methods. Dollars and sense prove it.

Dollars paid out of pocket for materials and equipment you seldom use just won't happen when you rely on Richmond.

Sense, sound common sense, tells you that faster, easier, erecting and stripping of forms is vital today, when on every job speed is a "must".

Do business with Richmond. You open up ten ways to profit. That Richmond 10-Way Profit Plan in the panel to the right tells you how. Let's talk business.

THE NAME SNAP-TY IS COPYRIGHTED BY US!
In 1930—11 years ago—Richmond, alone, coined and copyrighted the name Snap-Ty as the brand name for one of our tie products.

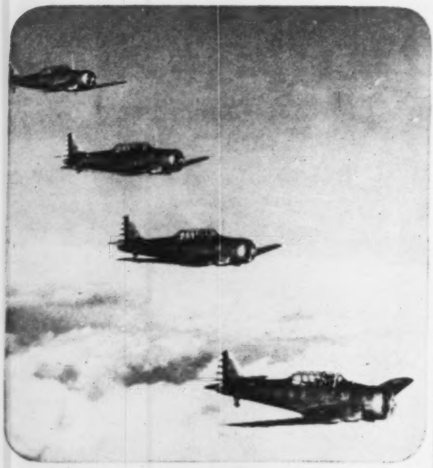
RICHMOND 10-WAY PROFIT PLAN

1—Over 60 different form-tying devices meeting every condition.
2—Cost less to use than usual "Home-Made" wire, band, or rodtys.
3—Engineered for safe working loads of 1500 to 25000 lbs.
4—Faster erecting and stripping saves time and lumber.
5—Promotes perfect wall alignment, plus uniform thickness.
6—1 to 2 inch "hold back" protects job against rust staining.
7—Weight scientifically cut to save shipping and handling costs.
8—Delivery right to the job saves warehousing. Job section labels save time.
9—No cost for working parts. You pay only for tys used.
10—Job planning bureau specifies types, quantities, methods . . . free.

ONE OR ALL OF THESE 10 ADVANTAGES

RICHMOND SCREW ANCHOR COMPANY, INC.
816 LIBERTY AVENUE • BROOKLYN, NEW YORK

TIME AND LABOR SAVING CONSTRUCTION DEVICES FOR CONCRETE CONSTRUCTION



North American's Dallas Plant

DEPENDS ON LAYNE WELLS AND PUMPS

Startling the Nation by going into production just one hundred and twenty days after construction began, the Dallas plant of North American Aviation, Inc., is now rolling out their famous Army AT-6A and Navy SNJ-3 Scout Trainer Planes. Factory and assembly space is completely air conditioned as an aid to accuracy, speed and efficiency in manufacturing.

As was the case with defense projects throughout the Nation, North American chose Layne Wells and Pumps for their water supply. Something over 1,400,000 gallons of water daily is available from their two Layne Units . . . and that capacity can go on day after day, month after month for years to come. In efficiency and dependability Layne Wells and Pumps have no parallel.

When the final chapter of America's greatest war is written, the part played by Layne Wells and Pumps will be a very absorbing story. Certainly in all the world, as hundreds of installations testify, there are no finer Well Water Systems. To meet the country's urgent demand for more and more production you may need more water. Act now! Communicate with Layne. Wire or address,

LAYNE & BOWLER, INC.
Memphis, Tenn.

LAYNE
PUMPS & WELL
WATER SYSTEMS

Affiliated Companies

Layne-Arkansas Company	Stuttgart, Ark.
Layne-Atlantic Company	Norfolk, Va.
Layne-Central Co.	Memphis, Tenn.
Layne-Northern Company	Mishawaka, Ind.
Layne-Louisiana Company	Lake Charles, La.
Layne-New York Co.	New York City.
Layne-Northwest Company	Milwaukee, Wis.
Layne-Ohio Company	Columbus, Ohio
Layne-Texas Company	Houston, Texas.
Layne-Western Company	Kansas City, Mo.
Layne-Western Co. of Minn.	Minneapolis, Minn.
Layne-Bowler New England Corp.	Boston, Mass.
International Water Supply, Ltd.	London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

of towns and villages, also construction of bypasses for facilitating military traffic.

ROAD MATERIALS, AGGREGATES. Gradation of Mineral Aggregates in Dense Graded Bituminous Mixtures, F. N. Hyeem. *Crushed Stone J.*, vol. 16, no. 4, July–Aug. 1941, pp. 9–15. Informative discussion on question of most favorable gradation of aggregates in pavement mixtures including bituminous as well as Portland-cement concrete.

SNOW AND ICE CONTROL. Gedanken zur Verhuetung von Spchneeverwehungen, Schaible. *Bautechnik*, vol. 19, no. 20/21, May 16, 1941, pp. 225–228. Discussion of snow fences, tree planting, and other measures practiced in Germany for snow control of highways, including cost data.

SANITARY ENGINEERING

ARGENTINA. Las Obras de Saneamiento de la Ciudad de Reconquista, P. E. Gabarrot and L. A. Duprat. *Boletin de Obras Sanitarias de la Nacion*, vol. 5, no. 47, May 1941, pp. 458–465. Sanitation works of city of Reconquista, in Province of Santa Fe, Argentina; water distribution system; sewage treatment plant.

ARGENTINA. Las Obras Sanitarias de la Ciudad de Vicente Lopez, P. G. Lovigne. *Boletin de Obras Sanitarias de la Nacion*, vol. 5, no. 50, Aug. 1941, pp. 118–126. Sanitary works of city of Vicente Lopez, in Province of Buenos Aires, Argentina; historical notes; growth in population from about 10,000 in 1905 to more than 80,000 in 1941; 1,500 business establishments and 15 industrial plants; water supply; sewage system; rain-water drainage.

WATER POLLUTION, GLOUCESTER, MASS., Salt-Water Pollution of Gloucester, Mass., Distribution System, F. H. Kingsbury. *New England Water Works Assn.—J.*, vol. 55, no. 2, June 1941, pp. 230–232. Report on case of contamination of water supply of Gloucester, Mass., due to pumping of salt water into public water distribution system during night of December 10 to 11, 1940; details of cross-connection that caused trouble; results of bacterial examination of samples of water.

WATER POLLUTION, ROCHESTER, N.Y. Pollution of Rochester, N.Y. Water Supply Through Cross-Connections, E. Devendorf. *New England Water Works Assn.—J.*, vol. 55, no. 2, June 1941, pp. 216–224, (discussion) 224–229. Report on pollution of public water supply of Rochester, N.Y., on December 11, 1940, when 75% of 500-mile distribution system became contaminated by raw Genessee River water pumped accidentally through unknown cross-connection between fire supply and municipally owned potable public water supply; procedure taken to notify public and remove pollution; chlorination of potable water supply with hypochlorite.

SEWERAGE AND SEWAGE DISPOSAL

BIOFILTRATION PROCESS. High Capacity Filtration; Biofiltration System, F. Bachmann. *Sewage Works J.*, vol. 13, no. 5, Sept. 1941, pp. 895–904. Review of development of biofiltration process of sewage treatment; lists of single stage, 2-stage, and 3-stage biofiltration plant installations in United States; results achieved by biofiltration processes; single-stage biofilter test results; comparison of filter depths.

CHLORINATION. Improving Plant Operation with Chlorine, W. E. Stanley. *Sewage Works Eng. & Mun. Sanitation*, vol. 12, nol 8, Aug. 1941, pp. 420–421. Lecture summarizing uses of chlorine in sewage treatment for disinfection, reduction of odors, grease separation, etc.

DIGESTION. Garbage Grinding at Goshen, H. W. Taylor. *Eng. News-Rec.*, vol. 127, no. 13, Sept. 25, 1941, pp. 441–443. Report on operating experiences at dual disposal plant serving New York village of 3,000; size of grinder screens, sludge tank design; moisture in gas; flotation of ground garbage; gas production; supernatant liquor; gas utilization.

DISPOSAL PLANTS, BIRMINGHAM, MICH. Operating Results and Experiences, Sewage Treatment Plant, Birmingham, Michigan, S. J. Mogelnicki. *Sewage Works J.*, vol. 13, no. 5, Sept. 1941, pp. 945–954. Features and operation of 1.5-mgd sewage-treatment plant of activated sludge type with separate sludge digestion; aeration with activated sludge; operation of sludge digestion tanks; gas utilization; sludge filtration; sludge disposal and utilization; operating costs.

DISPOSAL PLANTS, CHATHAM, N.Y. Chatham Sewage Treatment Plant and Its Operation, C. Lose, III. *Sewage Works J.*, vol. 13, no. 5, Sept. 1941, pp. 940–944. Features and operation of sewage treatment works of separate sludge digestion-trickling filter type designed for maximum daily flow of 500,000 gal from 4,000 people.

DISPOSAL PLANTS, CLARIFIERS. Multiple Tray Clarification at Modern Treatment Plant, J. K. Frei. *Sewage Works Eng. & Mun. Sanitation*, vol. 12, no. 8, Aug. 1941, pp. 423–425. Description and results of operation of multiple tray clarifiers of Southwest Works in Springfield, Mo.; flow diagrams.

DISPOSAL PLANTS, EQUIPMENT. Advertisers' Contributions. *Sewage Works J.*, vol. 13, no. 5, Sept. 1941, pp. 1020–1093. Reports from American firms describing products and developments in sewage treatment practice; Everdur Metal for Sewage Treatment Equipment; Bio-Activation process; sewage gas utilization systems; biofiltration system; combination units for small plants; pipe couplings and fittings; repair clamps and sleeves; automatic magnetite filter—recent trends in design and developments; new laboratory appliances; instruments for sewage treatment methods; etc.

DISPOSAL PLANTS, GRIT CHAMBERS. Desarenadores Regulados, A. A. Barbeito. *Boletin de Obras Sanitarias de la Nacion*, vol. 5, no. 48, June 1941, pp. 596–601. Regulated sand traps; fundamental object of sand traps on hydraulic works in general is to remove material carried in suspension; in sanitary engineering, particularly in sewage disposal plants, sand removal should be done in such manner that all grit to certain degree of fineness should be removed and that organic matter should not be deposited to cause mixture of offensive character; calculation of regulated grit chamber. Bibliography.

FILTERS, BIOLOGICAL. Accelo-Filter, H. W. Gillard. *Sewage Works, J.*, vol. 13, no. 5, Sept. 1941, pp. 918–926. Advantages of accelo-filters featuring controlled direct recirculation providing inoculation of aerobic process with previously aerated well activated material, accelerating biological oxidation of settled sewage or industrial waste; design data. Bibliography.

FILTERS, TRICKLING. Discussion of High-Capacity Trickling Filters, with Special Reference to Aero-Filters, J. A. Montgomery. *Sewage Works J.*, vol. 13, no. 5, Sept. 1941, pp. 905–917. Recommendations on operation of high capacity trickling filters and aero-filters; revamping standard filters; single-stage vs. two-stage filters; clarifiers; filter areas and filter depths; artificial ventilation.

GREASE DISPOSAL. Determination of Grease in Sewage, Sludge and Scum—II, H. W. Gehm. *Sewage Works J.*, vol. 13, no. 5, Sept. 1941, pp. 927–935. Results of series of experiments involving different types of filter media; method of determining grease content of sewage eliminating some of errors and time loss experienced with present evaporation method; outline of alum precipitation method.

LOUISVILLE, KY. Louisville to Treat Sewage Six Months Each Year, W. M. Caye and H. P. Eddy, Jr. *Sewage Works Eng. & Mun. Sanitation*, vol. 12, no. 8, Aug. 1941, pp. 416–419. Results of survey of sewage disposal at Louisville, Ky., disclosing need of treatment during 6 months of year when flow of Ohio River is low; sanitary condition of Ohio River; oxygen resources of river; loss in oxygen resources of Ohio River in passing Louisville; degree of treatment required.

ODOR CONTROL. Experiences in Odor Control. *Sewage Works J.*, vol. 13, no. 5, Sept. 1941, pp. 956–968. Summary of practical operating experiences with regard to odor abatement measures in sewage disposal plants; theoretical considerations; control of hydrogen sulfide; control by dilution; control by chemical treatment; odors incidental to plant operation.

PLANTS, CLEVELAND, OHIO. Operating Cleveland's Sewage Plants. *Eng. News-Rec.*, vol. 127, no. 13, Sept. 25, 1941, pp. 437–439. Analysis of first full year's operation data of Cleveland's 123-mgd Easterly activated sludge disposal plant and remodeled 45-mgd Imhoff tank-trickling filter Southerly plant, as well as of 36-mgd Westerly Imhoff plant placed in operation in 1922; effect of treatment processes at plants.

SEWERS, LINING. Iron Lining Rehabilitates Sewer, A. L. Boley. *Eng. News-Rec.*, vol. 127, no. 13, Sept. 25, 1941, pp. 439–440. Method of converting box culvert storm drain to sanitary sewer service by forming invert with half-pipe sections of iron pipe at cost of $12 per ft.

SLUDGE. Alum Treatment of Digested Sludge to Hasten Dewatering, W. A. Sperry. *Sewage Works J.*, vol. 13, no. 5, Sept. 1941, pp. 855–867. Comments on use of alum and other agents as aid in hastening dewatering of sludge on sand beds; details of experiments and experiences of Aurora Sanitary District, Aurora, Ill.; water released from sludges on drying bed with and without application of alum; cost and amount of water released from sludge by increasing alum doses. Bibliography.

SLUDGE. Filtration of Sewage Sludge at Lansing, Michigan, G. Wyllie. *Sewage Works J.*, vol. 13, no. 5, Sept. 1941, pp. 874–878. Review of results and problems encountered at Lansing, Mich., in vacuum filtration of digested sludge containing ground garbage.

SLUDGE. Sludge Filtration at Muskegon, Michigan, C. T. Mudgett. *Sewage Works J.*, vol. 13, no. 5, Sept. 1941, pp. 879–84. Review of operation of sewage sludge filters at Muskegon consisting of two small units, 3 ft in diameter by 16 ft long, 55 sq ft cloth area on each with common lime and ferric feeds; conditioning tank and feed equipment; cost data.

STRUCTURAL ENGINEERING

CHIMNEYS, LINERS. Prevention of Corrosion in Steel Chimneys, A. V. Staniforth. *Engineering*, vol. 152, no. 3948, Sept. 12, 1941, pp. 204–205. Description of patented system making use of articulated form of cover bars; ends of bars engage under cast-iron junction blocks, having projecting lugs with which semicircular lips engage; as lining and compound together are only $^5/_8$ in. thick, effective diameter of chimney is not materially reduced.

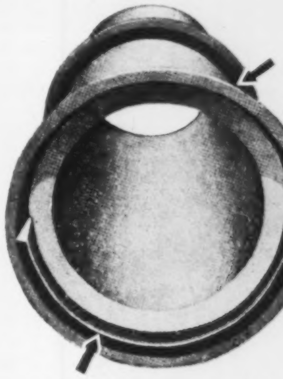
ECONOMICAL DURABLE WATER-TIGHT ROOT-REPELLENT

SEWER PIPE JOINT COMPOUNDS BY SERVICISED

Applying Tufflex

TUFFLEX . . . cold troweling plastic . . . really saves you money as it arrives at the job mixed, ready for immediate use. The joints obtained with this method are highly waterproof, flexible and durable. TUFFLEX is easily handled and will give you "good" joints at low material and labor cost.

PREMOULDED SEWER PIPE BELT . . . a modern product manufactured to give you 100% filled, strong, water-tight, root and acid resistant joints. The ends of each belt are beveled so that a perfect meeting is made for a tight joint with no leakage.



Premoulded Sewer Pipe Belt

HOT POURING COMPOUND . . . this is a very inexpensive asphaltic preparation, carefully compounded into a uniform and easy-to-work-with product. This is a quick-setting compound, producing tough, flexible, long-lasting joint connections. Thousands of pounds of this material has been used with a high degree of satisfaction throughout the country.

Additional information, prices and samples are available. Write today.

SERVICISED PRODUCTS CORPORATION

6051 W. 65th Street Chicago, Illinois

PROVED PROTECTION
Against WASTED PROFITS
Check these vital points ... here profit-leaks are frequently discovered by Industrial Management.

Send for Carey CHECK BOOK

IT TELLS HOW TO REDUCE PROFIT LEAKS

GUIDES you in making a complete check of your plant from roof to basement . . . tells where to look for waste in power production and in building maintenance . . . how to stop this waste. This book should be on the desk of every factory executive. It is yours for the asking. Write Dept. 81 for your copy today.

BUILT-UP and PREPARED ASPHALT ROOFINGS
ROOF PAINTS, COATINGS, CEMENTS
HEAT INSULATIONS
ASBESTOS-CEMENT CORRUGATED SIDING AND ROOFING
INDUSTRIAL FLOORING BUILDING INSULATION
EXPANSION JOINTS WATERPROOFING MATERIALS

These money-saving products are readily available through a nationwide service and distribution organization. Its experienced personnel will assist you in solving your maintenance problems. A nearby representative will call at your request.

THE PHILIP CAREY MANUFACTURING COMPANY
Dependable Products Since 1873
LOCKLAND . . . CINCINNATI, OHIO
In Canada: The Philip Carey Company, Ltd. - Office and Factory: Lennoxville, P. Q.

MANUAL OF MOMENT DESIGN

By JACK SINGLETON
MEMBER, AMERICAN SOCIETY OF CIVIL ENGINEERS

Something New

A Manual to be used in the accurate solution of bending moments in uniform or prismatic section members of Continuous Beams and Frames.

SIMPLE, QUICK, EXACT

NOT A BOOK ON THEORY

A companion book to the Singleton Manual of Structural Design

Books may be ordered from

AMERICAN INSTITUTE OF STEEL CONST.
101 Park Avenue, NEW YORK, N. Y.
OR
H. M. IVES & SONS
TOPEKA, KANSAS

PRICE $4.00 POSTPAID

BUFF

TRADE MARK TRADE MARK

WORLD FAMOUS FOR 74 YEARS

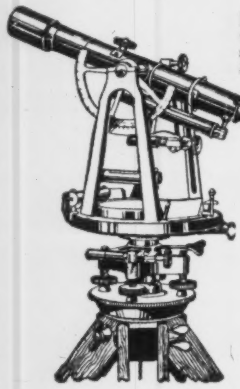
Transits and Levels for Civil and Mining Engineers

Buff precision and design are continuously in the forefront.

ENGINEERS and contractors know that BUFF performance is accurate and sure—with adjustments that hold permanently.

THE BUFF "X" TELESCOPE

has the finest and highest definition and simplest lens system. It is useful when the light is dim.



Buff is used almost exclusively on the largest works in this country and Canada and Mexico and So. America.

Astronomical lens experts.

All makes—intelligently repaired and regraduated by Factory Experts.

The **finest work** at the **LOWEST POSSIBLE COST.** Reliability and **guaranteed work.** A special Souvenir Plumb Bob sent gratis to graduate Civil Engineers.

THE Greatest ACCURACY
THE Hardest BRONZE
THE Simplest DESIGN

Buff & Buff Company

Jamaica Plain, Massachusetts

Engineering Aces

There's an engineering ace to help you through today's emergency, whatever the problem—the Pitman list takes you to the right man. Pitman Engineering Books are so well written that you will read every page; so conveniently planned that you will value them as references.

1	WOOD TECHNOLOGY Tiemann	$3.50
2	MODERN PLYWOOD Perry	$4.50
3	GLASS: THE MIRACLE MAKER Phillips	$4.50
4	SOIL MECHANICS AND FOUNDATIONS Plummer & Dore	$4.50
5	MODERN METALLURGY FOR ENGINEERS Sisco	$4.50
6	WELDED STEEL CONSTRUCTION Robert S. Hale	$3.00
7	MODERN AIR CONDITIONING, HEATING AND VENTILATING Carrier, Cherne and Grant	$4.50
8	SHIPFITTER'S MANUAL Crivelli	$1.50
9	PRACTICAL MATHEMATICS FOR SHIPFITTERS AND OTHER SHIPYARD WORKERS Moss	$1.50
10	MOTION STUDY Sampter	$1.75

PITMAN PUBLISHING CORPORATION

2 W. 45th St. Pitman Publishing Corporation New York

☐ Send books numbered..........

☐ Send fully descriptive leaflets on books numbered ....

☐ Send the complete engineering catalog.

Name...

Address...

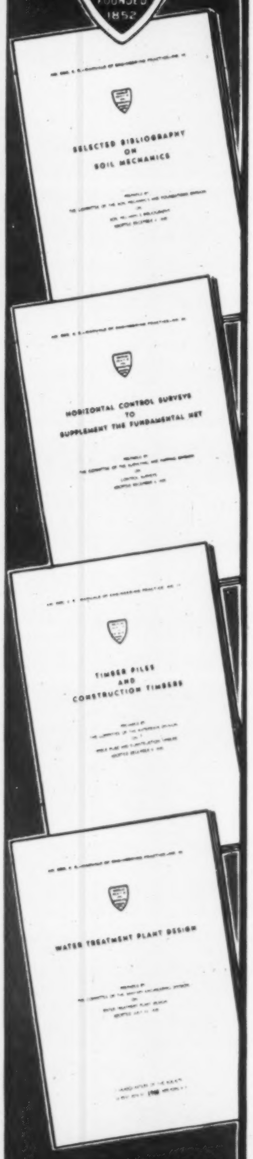
City.............................. State....................

CE-141

MANUALS

of ENGINEERING PRACTICE ✓

AMERICAN SOCIETY OF CIVIL ENGINEERS FOUNDED 1852



TEAR THIS AD OUT AND CHECK THE LIST FOR YOUR COPIES

1.	Code of Practice	$ .20
2.	Terms Used in Sewage Disposal Practice	.40
3.	Lock Valves	1.00
4.	Selected Bibliography on Construction Methods	1.00
5 and 6.	Charges and Method of Making Charges for Professional Services, each .50, both	1.00
7.	Government Services	.50
8.	Engineering and Contracting Procedure for Foundations	.40
9.	Steel Building Erection	.40
10.	Technical Procedure for City Surveys	1.90
11.	Letter Symbols and Glossary for Hydraulics	.60
12.	Construction Plant and Methods for Flood Control	1.00
13.	Filtering Materials for Sewage Treatment Plants	.60
14.	Location of Underground Utilities	.40
15.	Surveying Terms	.40
16.	Land Subdivision	1.20
17.	Timber Piles and Construction Timbers	.70
18.	Selected Bibliography on Soil Mechanics	1.00
19.	Water Treatment Plant Design	1.90
20.	Horizontal Control Surveys to Supplement the Fundamental Net	.90
21.	Standards of Professional Relations and Conduct	.50
22.	**Soils Mechanics Nomenclature**	.40
23.	Military Roads in Forward Areas	1.40
24.	Surveys of Highway Engineering Positions and Salaries	1.30

A discount of 50% from the above prices is allowed ASCE members of the

AMERICAN SOCIETY OF CIVIL ENGINEERS

33 W. 39th St., New York, N. Y.

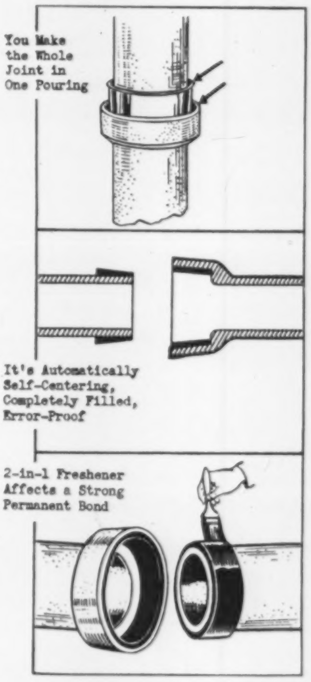
INDEX OF PRODUCTS

- Acetylene
  - Air Reduction Sales Co.
- Acetylene Generators
  - Air Reduction Sales Co.
- Aluminum, Structural
  - Aluminum Co. of America
- Anchors for Fenders and Tunnel Forms
  - Richmond Screw Anchor Co., Inc.
- Asphalt
  - Texas Co.
- Asphalt and Rubber Compounds
  - Servicised Products Corp.
- Asphalt Plank Bridge and Industrial Flooring
  - Philip Carey Mfg. Co.
  - Servicised Products Corp.
- Bars, Aluminum
  - Aluminum Co. of America
- Barges, Steel
  - American Bridge Co.
  - Chicago Bridge & Iron Co.
- Batching and Weighing Equipment, Concrete
  - Scientific Concrete Service Corp.
- Bins, Storage
  - American Bridge Co.
  - Chicago Bridge & Iron Co.
- Blasting Powder and Accessories
  - Atlas Powder Co.
- Books, Technical
  - H. M. Ives & Sons
  - Pitman Publishing Corp.
- Borings, Test
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Bridges
  - American Bridge Co.
- Bridge Planks, Mineral Surfaced Asphalt
  - Philip Carey Mfg. Co.
- Buildings, Steel
  - American Bridge Co.
- Caissons
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Cement, High - Early - Strength Portland
  - Lone Star Cement Corp.
- Cement, Portland
  - Lone Star Cement Corp.
  - Portland Cement Assn.
- Cold Mix
  - Texas Co.
- Concrete Forms
  - Douglas Fir Plywood Assn.
- Concrete Form Anchors, Wood or Steel Forms, Light and Heavy Construction
  - Richmond Screw Anchor Co., Inc.
- Construction Equipment
  - Scientific Concrete Service Corp.
- Contractors
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Corrugated Sheets, Aluminum
  - Aluminum Co. of America
- Culverts, Cast Iron
  - Cast Iron Pipe Research Assn.
- Damp-Proof Compounds
  - Philip Carey Mfg. Co.
- Drafting Instruments and Materials
  - Keuffel & Esser Co.
- Drafting Materials
  - Arkwright Finishing Co.
- Drawing Supplies
  - A. W. Faber, Inc.
  - Keuffel & Esser Co.
  - Koh-I-Noor Pencil Co.
- Dust Cure
  - Texas Co.
- Electric Blasting Supplies
  - Atlas Powder Co.
- Engines, Stationary, Diesel, and Gas
  - Caterpillar Tractor Co.
- Engineers
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Engineering Instruments
  - Keuffel & Esser Co.
- Expansion Joints, Asphalt, Cork and Rubber
  - Servicised Products Corp.
- Explosives
  - Atlas Powder Co.
- Filler, Asphalt
  - Philip Carey Mfg. Co.
- Flooring, Aluminum
  - Aluminum Co. of America
- Floor Tile, Rubber and Cork
  - Servicised Products Corp.
- Flux, Welding, Brazing, Etc.
  - Air Reduction Sales Co.
- Form Clamps, Concrete Wall Construction
  - Richmond Screw Anchor Co., Inc.
- Form Ties, Concrete Wall Construction
  - Richmond Screw Anchor Co., Inc.
- Foundations
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
  - Union Metal Mfg. Co.
- Gasholders
  - Chicago Bridge & Iron Co.
- Gauges, Acetylene, Oxygen
  - Air Reduction Sales Co.
- Graders, Elevating
  - Caterpillar Tractor Co.
- Graders, Motor
  - Caterpillar Tractor Co.
- Graders, Tractor or Horse Drawn
  - Caterpillar Tractor Co.
- Hanging Device for Concrete Forms
  - Richmond Screw Anchor Co., Inc.
- Heavy Stampings
  - Commercial Shearing & Stamping Co.
- Inks, Waterproof, Pigment, Drawing
  - Keuffel & Esser Co.
- Instruments
  - Buff & Buff Co.
  - Keuffel & Esser Co.
  - Polarizing Instrument Co.
- Joints, Expansion, Paving
  - Philip Carey Mfg. Co.
- Lettering Guides
  - Keuffel & Esser Co.
- Levels
  - Buff & Buff Co.
  - Keuffel & Esser Co.
- Liners, Tunnel
  - Commercial Shearing & Stamping Co.
- Machinery, Pipe Cutting and Bevelling
  - Air Reduction Sales Co.
- Measuring Tapes
  - Keuffel & Esser Co.
- Metal Connectors for Timber Joints
  - Timber Engineering Co.
- Metal Termite Shields
  - Timber Engineering Co.
- Nickel and Its Alloys
  - International Nickel Co., Inc.
- Oxygen
  - Air Reduction Sales Co.
- Paint Pigment, Aluminum
  - Aluminum Co. of America

Continued on page 32

BETTER
SEWER PIPE JOINTS
with Servicised 2-in-1 Die Cast Method

SERVICISED 2-in-1 Die Cast Method gives you better sewer pipe joints because you make the whole joint (both sides) with one pouring.


You Make the Whole Joint in One Pouring
It's Automatically Self-Centering, Completely Filled, Error-Proof
2-in-1 Freshener Affects a Strong Permanent Bond

You are sure that your joints are completely filled because both sections of the joint are matched and are thus automatically self-centering.

This method is more economical than ordinary methods because labor is reduced at the time of making the joint and matching it in the trenches. Maintenance cost is low as a result of using this procedure because the joints are 100% filled and the perfect bond that is effected by this material between each pipe is durable, flexible and root-repellant.

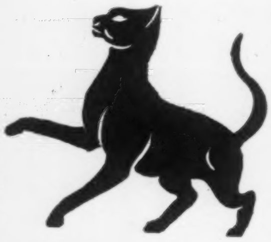
Specify the 2-in-1 Die Cast Method on your next project and obtain the maximum good-will from the owner and contractor.

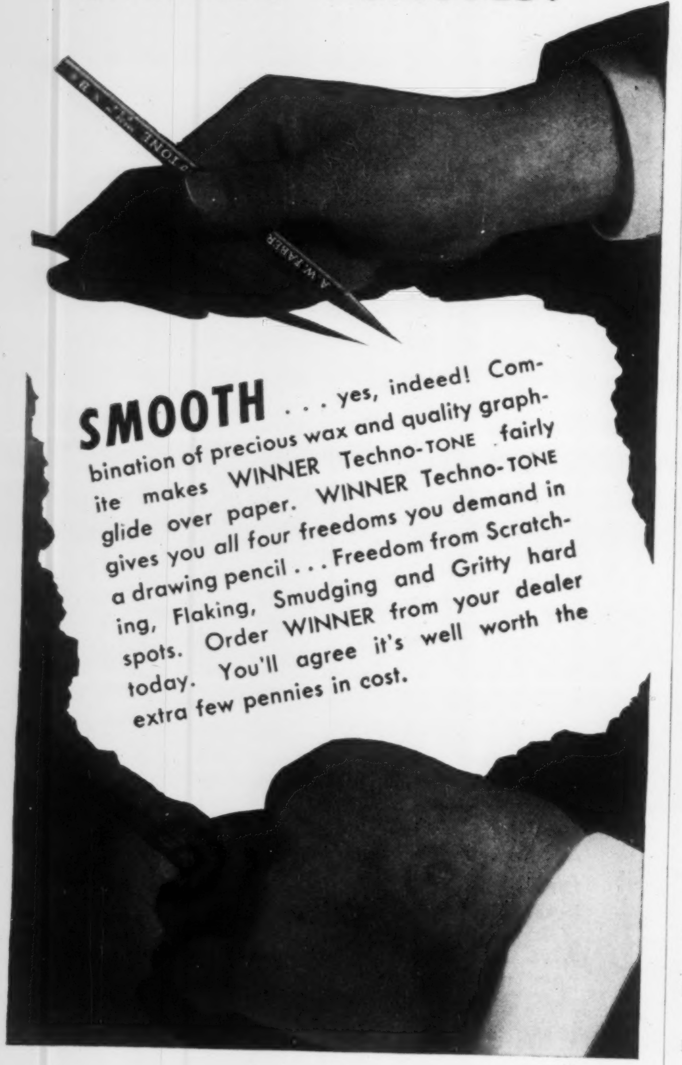
Samples and any other information you may desire will gladly be sent to you upon request

SERVICISED PRODUCTS CORPORATION
6051 West 65th Street
Chicago, Illinois

"13"

may be a Jinx on Friday but it stands for the "TOPS" in DRAWING PENCILS!





SMOOTH . . . yes, indeed! Combination of precious wax and quality graphite makes WINNER Techno-TONE fairly glide over paper. WINNER Techno-TONE gives you all four freedoms you demand in a drawing pencil . . . Freedom from Scratching, Flaking, Smudging and Gritty hard spots. Order WINNER from your dealer today. You'll agree it's well worth the extra few pennies in cost.

WINNER Techno-TONE
DRAWING PENCIL
13¢ 2 for 25c
translates GRAY MATTER into BLACK MATTER
Made in U.S.A. Polished rich green. Packed in metal box.

WINNER Techno-TONE
17 Degrees—6B to 9H
"It has the A. W. FABER name on it."

A·W·FABER·Inc. NEWARK N J

INDEX OF PRODUCTS

Continued from page 31

PAPER, DRAWING AND TRACING
Keuffel & Esser Co.

PAVING MATERIALS
Lone Star Cement Corp.
Portland Cement Assn.
Texas Co.

PENCILS
A. W. Faber, Inc.
Koh-I-Noor Pencil Co.

PENSTOCKS
American Bridge Co.
Chicago Bridge & Iron Co.

PILES, CONCRETE
Raymond Concrete Pile Co.
Union Metal Mfg. Co.

PILES, STEEL SHELL
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.
Union Metal Mfg. Co.

PILING, STEEL SHEET
Union Metal Mfg. Co.

PIPE, CAST IRON
Cast Iron Pipe Research Assn.

PIPE, STEEL
Chicago Bridge & Iron Co.

PIPE COATING, ASPHALT
Texas Co.

PIPE FITTINGS, CAST IRON
Cast Iron Pipe Research Assn.

PLASTIC, ASPHALT
Philip Carey Mfg. Co.

PLATE WORK
American Bridge Co.
Chicago Bridge & Iron Co.

PLYWOOD
Douglas Fir Plywood Assn.

POLARISCOPE
Polarizing Instrument Co.

PORTLAND CEMENT
Lone Star Cement Corp.
Portland Cement Assn.

PORTLAND CEMENT, HIGH-EARLY STRENGTH
Lone Star Cement Corp.

POWDER, BLASTING
Atlas Powder Co.

PUMPS
Layne & Bowler, Inc.

REGULATORS, OXYACETYLENE
Air Reduction Sales Co.

ROAD OILS
Texas Co.

ROAD MACHINERY, CONSTRUCTION AND MAINTENANCE
Caterpillar Tractor Co.

ROAD SURFACING MATERIALS
Texas Co.

ROOFING MATERIALS
Philip Carey Mfg. Co.
Servicised Products Corp.
Texas Co.

ROPE, WIRE
American Bridge Co.

SEWER PIPE BELTS, PREMOULDED
Servicised Products Corp.

SEWER PIPE COMPOUND
Servicised Products Corp.

SHEATHING, WOOD
Douglas Fir Plywood Assn.

SHEETS, ALUMINUM
Aluminum Co. of America

SHORING
Spencer, White & Prentis, Inc.

STACKS
American Bridge Co.
Chicago Bridge & Iron Co.

STANDPIPES
Chicago Bridge & Iron Co.

SURVEYING INSTRUMENTS
Buff & Buff Co.
Keuffel & Esser Co.

TANKS
American Bridge Co.
Chicago Bridge & Iron Co.

TECHNICAL BOOKS
H. M. Ives & Sons
Pitman Publishing Corp.

TERMITE SHIELDS
Timber Engineering Co.

TIMBER JOINT CONNECTORS
Timber Engineering Co.

TORCHES, WELDING AND CUTTING
Air Reduction Sales Co.

TOWERS, STEEL
American Bridge Co.

TRACING CLOTH
Arkwright Finishing Co.

TRACTORS, DIESEL AND GAS
Caterpillar Tractor Co.

TRANSITS
Buff & Buff Co.
Keuffel & Esser Co.

TUNNEL LINERS
Commercial Shearing & Stamping Co.

TURNTABLES
American Bridge Co.

TYING DEVICES FOR CONCRETE FORMS
Richmond Screw Anchor Co., Inc.

UNDERPINNING
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

WATER SUPPLY EQUIPMENT
Layne & Bowler, Inc.

WATERPROOFINGS, MEMBRANE
Philip Carey Mfg. Co.

WEIGHING AND BATCHING EQUIPMENT, CONCRETE
Scientific Concrete Service Corp

WELDING AND CUTTING APPARATUS
Air Reduction Sales Co.

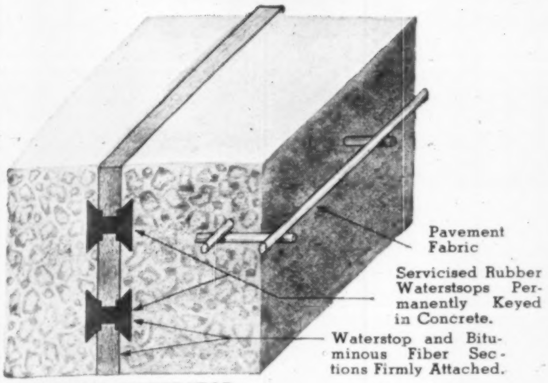
WELL WATER SYSTEMS
Layne & Bowler, Inc.

WIRE ROPE AND STRANDS
American Bridge Co.

Alphabetical Index to Advertisers shown on page 34

The Society reserves the privilege of rejecting advertisements inconsistent with its ethical procedure

WATER-TIGHT
EXPANSION JOINTS


Pavement Fabric
Servicised Rubber Waterstops Permanently Keyed in Concrete.
Waterstop and Bituminous Fiber Sections Firmly Attached.

SERVICISED WATERSTOP EXPANSION JOINT

The Servicised Waterstop Expansion Joint will prevent the infiltration of water and foreign matter during periods of concrete slab expansion or contraction. Contraction is generally a very critical stage, as this is the time when the joint crevice usually becomes exposed and water, pebbles, etc., get into the opening and do their destructive work. An examination of the illustration on the left will indicate to you how Waterstop lobes of the Servicised Waterstop Expansion Joint tends to prevent water from seeping into the joint crevices. A positive seal is maintained whether the slabs are expanded or contracted.

Want to know more about the Waterstop Expansion Joint? Testing samples and complete data will be promptly sent upon receipt of a letter from you.

Other SERVICISED Expansion Joints are: **Asphalt, Fiber, Cork, Cork-Rubber, Sponge Rubber and Self-Expanding Cork.**

SERVICISED PRODUCTS CORPORATION

6051 West 65th Street Chicago, Illinois

FILTERING MATERIALS FOR SEWAGE TREATMENT PLANTS
LOCATION OF UNDERGROUND UTILITIES
DEFINITIONS OF SURVEYING TERMS

The Last Word in Engineering

It will never be written—the last word in civil engineering. Modern practice continually improves upon the methods of yesterday or years past.

The Manuals of Engineering Practice, as periodically issued by the Society, are "the last word" or records of past practice, dependent upon the dates of publication. They are essential records.

Are your files complete with the twenty-two Manuals published to date?

THE AMERICAN SOCIETY OF CIVIL ENGINEERS
33 W. 39th Street New York, N. Y.

RELY UPON

Ask the first KOH-I-NOOR user you meet, and then ask a hundred more, and you will get the same unfailing answer, "KOH-I-NOOR can be relied upon to give you definite protection from all lead pencil troubles."

Throughout the fifty-odd years the KOH-I-NOOR pencil has been on the market, we have, through constant research, painstaking effort and strict adherence to material specifications, supplied critical users with a drawing instrument of superlative quality.

Rely upon KOH-I-NOOR

#1700 TECHNICRAYON PENCILS with small diameter lead, slightly soluble in water, are manufactured in 30 colors.

SEND FOR FREE BOOKLET NO. 4

KOH-I-NOOR
PENCIL COMPANY INC.
373 FOURTH AVENUE · NEW YORK

MICHIGAN AVENUE BRIDGE—CHICAGO

Completely resurfaced in 1939 with Servicised Mineral Surfaced Asphalt Plank

STANDARD ASPHALT PLANK

An installation of Servicised Asphalt Planking will produce for you an improved wearing surface on bridges, viaducts and approaches. Of exceptional durability, this material renders many years of low cost service.

It absorbs shocks, vibrations and movements in substructure, reduces traffic noise and is resilient at all temperatures.

MINERAL SURFACED ASPHALT PLANK

For a real safety surface use Servicised Mineral Surfaced Asphalt Plank. It gives a non-skid wearing surface and for this reason is especially interesting to public officials and to others who wish to employ every safety means possible in keeping accidents to the minimum.

Mineral Surfaced Asphalt Plank is formed by embedding rock particles into planking under great pressure.

Samples, prices and other information may be obtained without placing yourself under obligation. Write today.

SERVICISED PRODUCTS CORPORATION

6051 West 65th Street
SERVICISED QUALITY PRODUCTS © 1920
Chicago, Illinois

INDEX TO ADVERTISERS

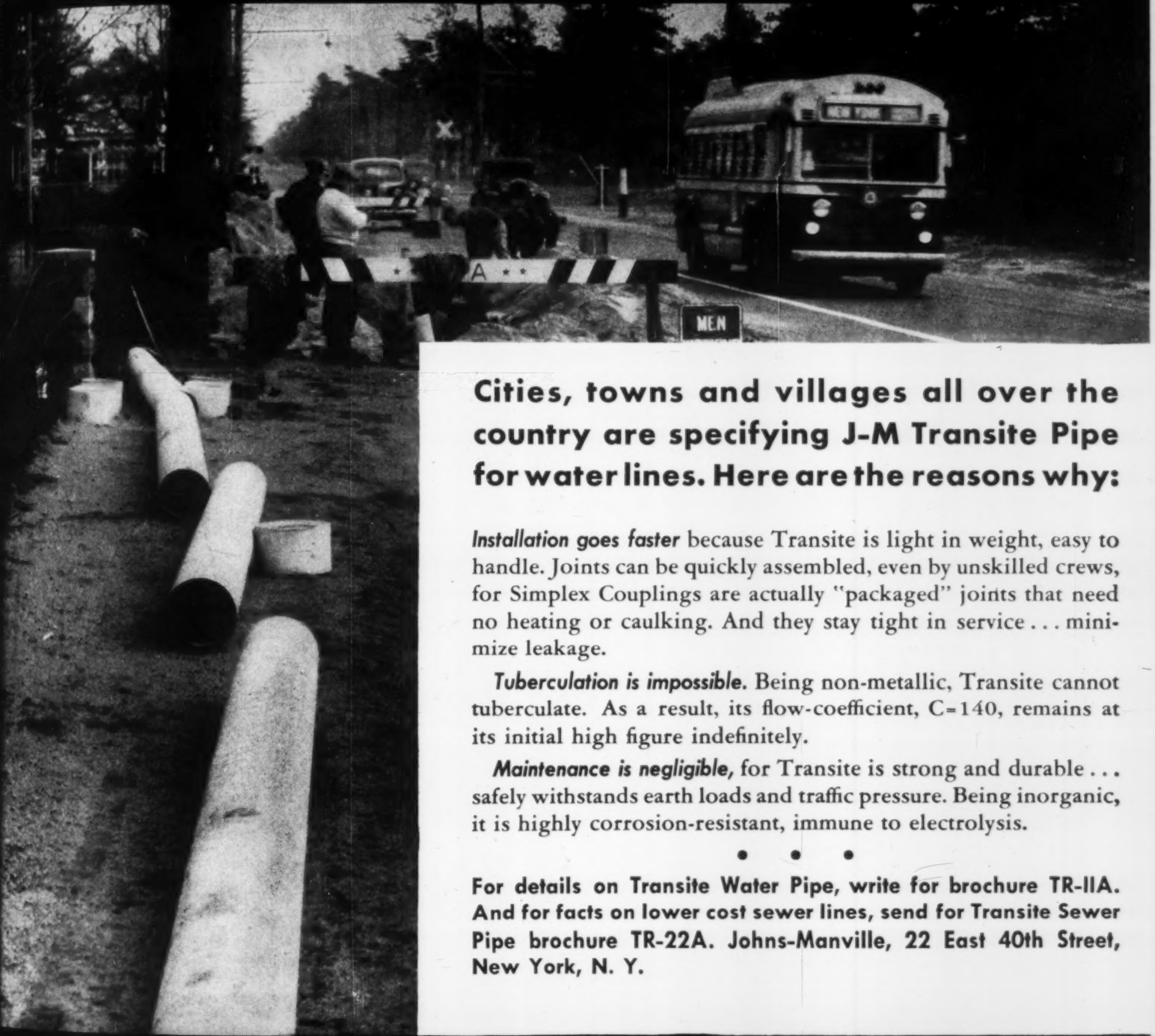
ALPHABETICAL

AIR REDUCTION SALES COMPANY 11
ALUMINUM COMPANY OF AMERICA 8
AMERICAN BRIDGE COMPANY 13
(United States Steel Corporation subsidiary)
ARKWRIGHT FINISHING COMPANY 24
ATLAS POWDER COMPANY 25
BUFF & BUFF COMPANY 30
PHILIP CAREY MANUFACTURING COMPANY . . 29
CAST IRON PIPE RESEARCH ASSOCIATION 9
CATERPILLAR TRACTOR COMPANY . . . . 2 *and* 3
CHICAGO BRIDGE & IRON COMPANY 6
COMMERCIAL SHEARING & STAMPING COMPANY . 26
DOUGLAS FIR PLYWOOD ASSOCIATION 17
A. W. FABER, INC. 32
INTERNATIONAL NICKEL COMPANY, INC. . . . 1
H. M. IVES & SONS 29
KEUFFEL & ESSER COMPANY 19
KOH-I-NOOR PENCIL COMPANY 33
LAYNE & BOWLER, INC. 28
LONE STAR CEMENT CORPORATION 4
PITMAN PUBLISHING CORPORATION 30
POLARIZING INSTRUMENT COMPANY 26
PORTLAND CEMENT ASSOCIATION 21
RAYMOND CONCRETE PILE COMPANY . *Second Cover*
RICHMOND SCREW ANCHOR CO., INC. 27
SCIENTIFIC CONCRETE SERVICE CORPORATION . . . . *Back Cover*
SERVICISED PRODUCTS CORPORATION 29, 31, 33 *and* 34
SPENCER, WHITE & PRENTIS, INC. 26
TEXAS COMPANY . . . . *Third Cover*
TIMBER ENGINEERING COMPANY 23
UNION METAL MANUFACTURING COMPANY . . 15
U. S. STEEL CORPORATION SUBSIDIARY 13

Index to Products Shown on Pages 31 and 32

More and More Engineers are Taking Advantage of

THIS BASIC ADVANCE IN WATER-LINE ENGINEERING



Cities, towns and villages all over the country are specifying J-M Transite Pipe for water lines. Here are the reasons why:

Installation goes faster because Transite is light in weight, easy to handle. Joints can be quickly assembled, even by unskilled crews, for Simplex Couplings are actually "packaged" joints that need no heating or caulking. And they stay tight in service . . . minimize leakage.

Tuberculation is impossible. Being non-metallic, Transite cannot tuberculate. As a result, its flow-coefficient, C=140, remains at its initial high figure indefinitely.

Maintenance is negligible, for Transite is strong and durable . . . safely withstands earth loads and traffic pressure. Being inorganic, it is highly corrosion-resistant, immune to electrolysis.

• • •

For details on Transite Water Pipe, write for brochure TR-IIA. And for facts on lower cost sewer lines, send for Transite Sewer Pipe brochure TR-22A. Johns-Manville, 22 East 40th Street, New York, N. Y.

Johns-Manville TRANSITE PIPE

AN ASBESTOS PRODUCT

For efficient, economical water and sewer lines

Changes in Membership Grades

Additions, Transfers, Reinstatements, and Resignations

From December 10, 1941, to January 9, 1942, Inclusive

ADDITIONS TO MEMBERSHIP

Almy, Loren Billings (Assoc. M. '41), Asst. Prof., Civ. Eng., Univ. of North Dakota (Res., 2023 University Ave.), Grand Forks, N. Dak.

Alter, Howard Russell, Jr. (Jun. '41), Detailer, Am. Bridge Co., Ambridge, Pa.

Andersen, Neal Edgar (Jun. '41), 101 Aster Court, Brooklyn, N.Y.

Anderson, Daniel French (Assoc. M. '41), Civ. Engr., Federal Works Agency, Grand River Dam Project, Vinita, Okla.

Anderson, James Thomas (Jun. '41), Care, Richard Dudgeon, Inc., 24 Columbia St., New York, N.Y.

Atkin, Bernard (M. '41), Asst. Engr., State Div. of Highways, 424 Centennial Annex (Res., 423 West Monroe St.), Springfield, Ill.

Austin, Walter James (Jun. '41), 105 Talbot Laboratory, Univ. of Illinois, Urbana, Ill.

Backlond, Mauno Oliver (Jun. '41), Civ., Engr., Wilbur Watson & Associates, Ravenna Ordnance Plant, Ravenna (Res., 6511 Pearl Rd., Cleveland), Ohio.

Baker, Barnet (Assoc. M. '41), Senior Asst. Civ. Engr., City of Cleveland, 518 City Hall (Res., 1334 Lakeview Rd.), Cleveland, Ohio.

Baker, Robert Denio (Jun. '41), Instrumentman, C.M.S.P. & P.R.R., 420 North Artesian Ave. (Res., 4251 West Irving Park Rd.), Chicago, Ill.

Balcom, Alonzo Adolphus, Jr. (Jun. '41), 2d Lt., 24th Engr. Battalion (A), U.S. Army, Pine Camp, N.Y.

Barber, Bruce Palmer (M. '41), Associate Mgr., Tomlinson Eng. Co., 1226 Sumter St., Columbia, S.C.

Beaudry, Erwin Edward (Jun. '41), Junior Engr., U. S. Engrs., Clock Tower Bldg., Rock Island, Ill.

Beemer, Chester Arthur, Jr. (Jun. '41), 2016 Market St., Harrisburg, Pa.

Benton, Robert Tyrie (Jun. '41), Apartado 246, Caracas, Venezuela.

Bond, Emory, Jr. (Jun. '41), Junior Engr., Magnolia Petroleum Co., 2121 North Henderson, Dallas, Tex. (Res., Burlingame, Kans.)

Bonnett, Gerson (Jun. '41), Asst. Res. Engr., Brighton Dam, Washington Suburban San. Comm. (Res., 5704 Forty-first Ave.), Hyattsville, Md.

Bottomley, Herbert Hanford (Jun. '41), Senior Eng. Aid, State Highway Dept., 497 Main, East Hartford (Res., 292 Beechwood Ave., Bridgeport), Conn.

Boyd, Edward Sutherland (Jun. '41), Designer, Ebasco Services, Inc., 2 Rector St. (Res., 1594 Unionport Rd.), New York, N.Y.

Brendle, Ralph C. (Jun. '41), With U.S. Bureau of Reclamation, Customs Bldg., Denver (Res., 3703 South Sherman, Englewood), Colo

Broadman, Howard Milton (Jun. '41), Transitman, H. R. H. Constr. Corp., 9 East 40th St., New York, N.Y. (Res., 7603 Boulevard East, North Bergen, N.J.)

Brosta, Joseph (Jun. '41), Civ. Engr., Hunkin-Conkey Constr. Co., Ravenna Ordnance Plant, Ravenna (Res., 3121 East 93d St., Cleveland), Ohio.

Buol, Harvey Melvin (Jun. '41), Ensign, U.S. N.R., Post Graduate School, U.S. Naval Academy, Annapolis, Md.

Bushnell, Donald Henderson (M. '41), Asst. Chf., Appraisal Eng. Farm Credit Administration, 1300 E St., N.W. (Res., 6694 Thirty-second St., N.W.), Washington, D.C.

Carlson, Theodore Wilbur (Jun. '41), Structural Draftsman, Pacific Car & Foundry Co., 620 West Hudson (Res., 6518 Eighteenth Ave., N.E.), Seattle, Wash.

Chase, Robert Addison (Jun. '41), 2024 North 16th St., Apt. 9, Omaha, Nebr.

Cheney, Donald LeRoy (Assoc. M. '41), Constr. Engr., S. Birch & Son Constr. Co., Ford Bldg., Great Falls (Res., 907 West Watson St., Lewistown), Mont.

Christina, Carlos Joseph (Jun. '41), Junior Civ. Engr., SCS, U.S. Dept. of Agriculture, Box 500 CCC Camp, Abbeville (Res., 1747 North Broad Ave., New Orleans), La.

Clark, Joseph (Jun. '41), Draftsman, Am. Bridge Co., Ambridge, Pa. (Res., Alger, Ohio.)

Clark, Thomas Alexander (Jun. '41), Junior Civ. Engr., TVA, Pound Bldg. (Res., Central Y.M.C.A.), Chattanooga, Tenn.

Coleman, Robert Feaster, Jr. (Jun. '41), Box 5403, State College Station, Raleigh, N.C.

Cook, Frank Bernard (Jun. '41), 12 Pomeroy St., Allston, Mass.

Corlett, Harry Beaumont (Assoc. M. '41), Asst. Chf. Engr., Contrs., Pacific Naval Air Bases, Alameda (Res., 5909 Shafter Ave., Oakland), Calif.

Curtis, David Haws (Jun. '41), With Am. Bridge Co. (Res., 1824 West 5th Ave.), Gary, Ind.

Curtis, Oliver Benton, Sr. (Assoc. M. '41), Planning Engr., Public Work Reserve, Box 3, Jackson, Miss.

Dahlstrom, Irving John (Jun. '41), Student Engr. (Structural), Office Engr., The Panama Canal, Ancon, Canal Zone.

Doolittle, Edward Phil (Jun. '41), Senior Eng. Aide, U.S. Engr. Dept., 700 Central Bldg., Seattle (Res., Woodinville), Wash.

Dorfman, Joseph Samuel (Jun. '41), Junior Engr., Airport Design Section, Runway Group, U.S. Engr. Office, War Dept., 751 South Figueroa St., Los Angeles (Res., 10928 Huston St., North Hollywood), Calif.

Dreyfuss, Albert Milford, Jr. (Jun. '41), Junior Engr., U.S. Engrs., Army Post Office 803, Port of Spain, Trinidad.

Duba, John, Jr. (M. '41), Senior Civ. Engr., Public Works Office, Naval Air Station, Quonset Point (Res., 28 Miantonomi Ave., Newport), R.I.

Emert, Gene Carroll (Jun. '41), With Mauran, Russell, Crowell & Mullgardt & Giffels & Vallet, St. Louis, Mo. (Res., 2845 Washington Ave., Granite City, Ill.)

Engle, Harold Marshall (M. '41), Civ. and Structural Engr., 110 Sutter St., San Francisco, Calif.

Estabrook, Frederick Dickinson (Jun. '41), Tongue Point, Ore.

Finlayson, Robert Archibald (Assoc. M. '41), Associate Naval Archt., U.S.N., Supervisor. Ship Building Office, Willamette Iron & Steel Corp. (Res., 3334 North East Oregon St.), Portland, Ore.

Fountain, Joseph William (Jun. '41), Draftsman, Am. Bridge Co., Bridge St., Gary, Ind.

Froehlich, William Robert Benjamin (Jun. '41), Lt., Company A, 1st Battalion, U.S. Army, Engr. Replacement Training Center, Fort Belvoir, Va.

Fuhriman, Dean Kenneth (Jun. '41), Instr. in Eng., Utah State Agri. College (Res., 271 East 3d North), Logan, Utah.

Getzman, Edwin Mitts (Jun. '41), Asst. Civ. Engr., SCS, 111 South Broadway, Yreka, Calif.

Gulbrandson, Don Ivor (Jun. '41), Junior Engr., Maintenance Branch, Post Office Dept., Washington, D.C. (Res., 3420 Lee Blvd., Arlington, Va.).

Hair, Charles William, Jr. (Jun. '41), 2d Lt., Corps of Engrs., U.S. Army, 88th Engr. Battalion, Camp Beauregard, La.

Harbert, Gene Woodrow (Jun. '41), Junior Engr., U.S. Geological Survey, Box 11, Williams, Calif.

Harris, Arthur Raymond (M. '41), Asst. Engr., Bridges, C.&N.W. Ry., 400 West Madison St., Room 1520, Chicago, Ill.

Harris, Charles Gold (Jun. '41), Rodman, Eng. Dept., C.M.St.P. & P. R.R., 801 Chicago Ave., Savanna, Ill.

Hedrick, John Howard (Jun. '41), Junior Engr., Southwest Welding and Mfg. Co., Alhambra (Res., 200 North Gerona, San Gabriel), Calif.

Heiselman, Christopher Frank (Assoc. M. '41), Asst. Engr., Board of Water Supply, City of New York, Merriman Dam, Lackawack, N.Y.

Henel, William Frederick (Jun. '41), Asst. Field Engr., Frederick Snare Corp., 117 Liberty St., New York (Res., 47 Spooner St., Huguenot), N.Y.

Herr, Joseph, Jr. (Jun. '41), Archt.-Engr., Am. Can Co., 230 Park Ave. (Res., 4580 Broadway), New York, N.Y.

Hoerner, John Everett (Jun. '41), Ensign, U.S.N.R., Naval Air Station, Bachelor Officers' Quarters, Seattle, Wash.

Hogan, George Elmer (Assoc. M. '41), Chf. Eng. Insp., The Austin Co., Dexter Horton Bldg., Seattle, Wash. (Res., 185 Martin Ave., Palo Alto, Calif.)

Hogensen, Robert Charles (Jun. '41), Draftsman, Glenn L. Martin (Res., 3311 Guilford Ave.), Baltimore, Md.

Horlander, Fred Clark (Jun. '41), Valuation Analyst, State Dept. of Revenue, New State Office Bldg. (Res., 403 Coleman Ave.), Frankfort, Ky.

Horth, Robert James (Jun. '41), Instrumentman, Central Eng. and Const. Co., 607 Peoples Bank (Res., 3906 Washington Blvd.), Indianapolis, Ind.

Hunt, Dick Alwyn (Assoc. M. '41), Project Cost Engr., Corps of Engrs., U.S. Army, Louisiana Ordnance Plant, Minden (Res., 1901 Centenary Blvd., Apt. N-113, Shreveport), La.

Hyde, Obert Robert (Assoc. M. '41), Field Engr., Pacific Naval Air Base Contrs., Midway Island, Oceania.

Jacoby, Robert Gordon (Jun. '41), With Civ. Eng. Dept., Princeton Univ. (Res., 169 Nassau St.), Princeton, N.J.

Klindt, Pedro (Jun. '41), Civ. Engr., Parsons, Klapp, Brinckerhoff & Dougas, Box 168, Caracas, Venezuela.

Kohn, Edwin Storch (Jun. '41), Junior Naval Archt., Navy Yard, Philadelphia, Pa. (Res., 222 West 83d St., New York, N.Y.)

Krome, John Elliott (Jun. '41), 23 South West College, Princeton, N.J.

Lawrence, Lloyd Smith (Jun. '41), 8 Mellen St., Cambridge, Mass.

LeGro, Gwynne Damon (Jun. '41), With U.S. Army, Fort Leonard Wood, Mo. (Res., East 329 Thirtieth, Spokane, Wash.)

Lersch, William Harwood (Jun. '41), 309 South Lake St., Neenah, Wis.

Levine, Martin (Jun. '41), Insp., U.S.N., Navy Yard (Res., 1549 Marine Parkway), Brooklyn, N.Y.

Linke, Harold Adolph, Jr. (Jun. '41), 2d Lt., 36th Field Artillery, U.S. Army, Fort Bragg, N.C.

Macleod, John Holmes, Jr. (Jun. '41), With Special Eng. Div., Protection Section, The Panama Canal, Box 784, Diablo Heights, Canal Zone.

McCleer, Philip Arthur (Jun. '41), Structural Engr., Giffels & Vallet, Inc., 1000 Marquette Bldg., Detroit (Res., Gregory), Mich.

TOTAL MEMBERSHIP AS OF JANUARY 9, 1942

Members	5,745
Associate Members	6,817
Corporate Members	12,562
Honorary Members	37
Juniors	4,804
Affiliates	68
Fellows	1
Total	17,472

An Engineer's
THREE R's

TECO CONNECTORS

spread the load on a timber joint more equally over the cross-section of the wood

READY! There is no shortage of timber—immediate deliveries are certain.

RUSH! Prefabrication by the TECO Connector System of timber construction speeds the job and ***gets the contract.***

REDUCES COST! The TECO Connector System cuts man-hours and material costs because fabricators deliver members ready to install—and permits lighter timber to do the work.

Get Complete Details—MAIL COUPON!

TIMBER ENGINEERING COMPANY, INC. Dept. R 2.
1337 Connecticut Avenue, Washington, D. C.

Please send me without cost or obligation complete information on the TECO Connector System of construction.

Individual.. Firm..............................

Street.............................. City.................................... State..................

Timber
ENGINEERING COMPANY
Dept. R 2. 1337 Connecticut Avenue
WASHINGTON, D. C.

McConkey, Russell Emery (Assoc. M. '41), Associate Engr., State Highway Comm. (Res., 1936 High St.), Topeka, Kans.

Mahaffey, Starry Jencks (Assoc. M. '41), County Mgr., Henrico County, Henrico Court House, Richmond, Va.

Marcondes Ferraz, Octavio (M. '41), Av. Don Pedro 1, No. 1113, São Paulo, Brazil.

Martin, Leonard (Jun. '41), Junior Engr., U.S. Army Engrs., New Federal Bldg. (Res., 112 South Atlantic Ave.), Pittsburgh, Pa.

Martinek, James Franklin, Jr. (Jun. '41), Junior Engr., U.S. Engrs., War Dept., 751 South Figueroa St. (Res., 1931 South Harvard Blvd.), Los Angeles, Calif.

Martinson, Raymond Andrew (Jun. '41), Student Engr., Office Eng. Div., Dept. of Operation and Maintenance, The Panama Canal, Balboa Heights, Canal Zone.

Miller, Bernard Langdon (Jun. '41), 450 South Dennis Ave., Decatur, Ill.

Montgomery, Melvin Henry (Jun. '41), Draftsman, James J. Burke & Co., 404 Kearns Bldg. (Res., 131 P St.), Salt Lake City, Utah.

Moore, Vincent Bayard (M. '41), Civ. Engr. and Supt. of Maintenance, Care, Utilities Officer, U.S. Army, War Dept., Lowry Field (Res., 3014 East 17th Ave.), Denver, Colo.

Moultrop, Kendall (Jun. '41), 2d Lt., Company K, 26th Infantry, U.S. Army, Fort Devens, Mass. (Res., 97 Massachusetts Ave., Lincoln Park, R.I.)

Murphy, Thomas Edward (Jun. '41), Asst. Hydr. Engr., Special Eng. Div., The Panama Canal, Diablo Heights, Canal Zone.

Myrhaugen, George Kenneth (Jun. '41), 1437 Third St., Havre, Mont.

Naughton, John Francis (Jun. '41), Engr., Lukenweld, Inc. (Res., 1219 Olive St.), Coatesville, Pa.

Norman, Van Cresap (Assoc. M. '41), Capt. U.S. Army, 702d Military Police Battalion (Z/1), Fort Brady, Sault Ste. Marie, Mich.

Norris, Max LeRoy (Jun. '41), 2d Lt., Corps of Engrs., U.S. Army, Office of Project Engr., Nebraska Ordnance Plant, Wahoo, Nebr.

Olsen, John Thorvelt (M. '41), Senior Drainage Engr., SCS, U.S. Dept. of Agriculture, Box 448, Greenwood, Miss.

Payne, Charles Otto (Jun. '41), Steel Detailer, Am. Bridge Co., Frick Bldg., Pittsburgh (Res., 325 Frederick Ave., Sewickley), Pa.

Perna, Francis John (Jun. '41), Junior Structural Engr., TVA, 300 Arnstein Bldg. (Res., 1727 White Ave.), Knoxville, Tenn.

Pillow, Ward Bullock (Jun. '41), Junior Highway Engr., Highway Design and Railroad Div., TVA (Res., 209 Caldwell Ave.), Paris, Tenn.

Preston, Winfield Scott, Jr. (Jun. '41), Junior Mech. Engr., U.S.N., David Taylor Model Basin, Washington, D.C. (Res., Langley, McLean Post Office, Va.)

Pully, Robert Vinson (Jun. '41), Asst. Engr., Corps of Engrs., U.S. Army, Dist. Office, Fort Sam Houston (Res., 142 Montclair, San Antonio), Tex.

Quick, Boyard Rollin (Jun. '41), Eng. Aide, The Panama Canal, Diablo Heights, Canal Zone.

Ricketts, Allan Townshend, Jr. (Jun. '41), Looper, Bethlehem Steel Co. (Res., 62 East Market), Bethlehem, Pa.

Ridley, Elgan McNeile (Assoc. M. '41) Cons. Engr., 804 West Levee, Brownsville, Tex.

Rosenthal, Robert William (Jun. '41), Structural Designer, Office Eng. Div., The Panama Canal, Balboa Heights, Canal Zone.

Ruiz Gonzalo, José Manuel (Jun. '41), Civ. Engr., Box 51, San Juan, Puerto Rico.

Saad, Michel Assad (Jun. '41), Instr., Extension and Tutor in Civ. Eng., Univ. of Texas, 501 Sixth St., Austin, Tex.

Salzman, Milton Gremmels (M. '41), Civ. Engr., Ebasco Services, Inc., 2 Rector St., New York (Res., 73 Manor Rd., Lynbrook), N.Y.

Sandkuhle, Raymond Carl (Jun. '41), Production Coordinator, Union Diesel Engine Co., 2200 East 7th, Oakland (Res., Danville), Calif.

Sargent, Harold Vernon (Jun. '41), Checker, State Bridge Dept., Transportation Bldg., Olympia (Res., Spanaway), Wash.

Seabrook, Chancy Sabine (Assoc. M. '41), Chf. Civ. Engr., Office, Const. Quartermaster, U.S. Army, Fort Lewis, Wash.

Skrinde, Raymond Arthur (Jun. '41), With 29th Engrs., Company A, U.S. Army, Oceanside, Calif. (Res., East Stanwood, Wash.)

Smith, George Thomas, Jr. (Jun. '41), Eng. Aide, TVA, Cherokee Dam, Jefferson City (Res., 402 North Cumberland St., Morristown), Tenn.

Smith, Ralph Carl (Assoc. M. '41), West 2623 Glass Ave., Spokane, Wash.

Stanley, Armour LaMont (Jun. '41), Min. Engr., Oliver Iron Min. Co., Coleraine, Minn.

Stone, Clarence Etsler (Jun. '41), Ensign, A-V (S), U.S.N.R., Naval Operating Base, Argentia, Newfoundland.

Story, James Robert (Jun. '41), Instr., Mech. Eng. Dept., Agri. and Mech. College of Texas, College Station, Tex.

Strieber, Alton LeRoy (Assoc. M. '41), Care, H. R. F. Helland, 303 Frost National Bank Bldg., San Antonio, Tex.

Strohl, LeRoy Sterling, Jr. (Jun. '41), Engr. Apprentice, P.R.R., Care, Chf. Engr., M. of W., Pennsylvania Station (Res., Y.M.C.A.), Pittsburgh, Pa.

Styer, Wilhelm Delp (M. '41), Col., Corps of Engr., U.S. Army, 2014 New Railroad Retirement Bldg., Washington, D.C.

Summer, Walter Bassett (Jun. '41), Asst. Civ. Engr., TVA, Box 432, Savannah, Tenn.

Talley, Claude Edward (Jun. '41), Senior Eng. Aide, TVA, Murphy, N.C.

Tapman, Walter Panich (Jun. '41), Junior Engr., Board of Water Supply, City of New York, Lackawack, N.Y.

Tashjian, Armen Haigouni (M. '41), (H. A. Kuljian & Co.), 1518 Walnut St., Philadelphia, Pa.

Taylor, Howard George (Jun. '41), Junior Engr. (Civ.), U.S. Engrs., War Dept., Room 200 Post Office Bldg. (Res., 1700 G St.), Sacramento, Calif.

Taylor, Robert David (Jun. '41), Student Engr. (Civ.), Special Eng. Div., The Panama Canal, Cocoli, Canal Zone.

Tocher, Frank Laurain (Jun. '41), Engr., The Texas Co., 205 East 42d St., New York (Res., 89-25 Parsons Blvd., Jamaica), N.Y.

Townsend, Paul Arthur (Jun. '41), 2d Lt., 87th Infantry Mountain Regiment, U.S. Army, Fort Lewis, Wash. (Res., 59 Water St., Lebanon, N.H.)

Treloar, Richard William (Jun. '41), Eng. Asst., Southern New England Telephone Co., Washington St. (Res., 31 Thames St.), New London, Conn.

Turner, Robert Edwin (M. '41), Hydrographer, The Susquehanna Elec. Co., Conowingo, Md.

Van Deusen, Alden Johnson (Jun. '41), Junior Engr., U.S. Eng. Dept., 751 South Figueroa St. (Res., 2807 San Marino St.), Los Angeles, Calif.

Waigand, LeRoy Gram (Jun. '41), Civ. Engr. (Structural), Leeds, Hill, Barnard & Jewett, 1001 Edison Bldg., Los Angeles (Res., 83½ North Catalina Ave., Pasadena), Calif.

Walker, Arthur Valentine (Assoc. M. '41), Asst. Bridge Engr., Bridge Dept., State Div. of Highways, Box 1499, Sacramento, Calif.

Wallace, Henry William (Jun. '41), Junior Engr., U.S. Engr. Office, 1217 New Post Office Bldg. (Res., 579 Sherburne Ave.), St. Paul, Minn.

Weiss, August Louis (Jun. '41), Designer-Trainee, Emsco Derrick & Equipment Co., Box 1289 (Res., 8224 Grafton), Houston, Tex.

Wise, Lauress Lee (Jun. '41), With Standard Oil Co., 119th and Front Sts., Whiting, Ind. (Res., 7515 Kingston Ave., Apt. 204, Chicago, Ill.)

Woinich, Peter (Jun. '41), With Republic Fireproofing Co., 31 Union Square, New York (Res., 421 East 21st St., Brooklyn), N.Y.

Zikan, Joseph (Jun. '41), Junior Engr., War Dept., 751 South Figueroa St. (Res., 715 South Hope St.), Los Angeles, Calif.

Zurmuhlen, Frederick Henry (M. '41), Chf. Engr., George F. Driscoll, Walsh Constr. Co., 41 East 42d St., New York (Res., 197 Clinton Ave., New Brighton), N.Y.

Membership Transfers

Belladonna, Edmond Leo (Jun. '31; Assoc. M. '41), Asst. Engr., U.S. Engr. Office, War Dept., Huntington, W.Va.

Bowmaster, Wylie Albert (Jun. '35; Assoc. M. '41), Associate Hydr. Engr., TVA, Knoxville (Res., Norris), Tenn.

Burt, Gordon Lansing (Jun. '35; Assoc. M. '41), Res. Engr., Charles H. Hurd, 333 North Pennsylvania St., Indianapolis (Res., 111 South 23d St., Terre Haute), Ind.

Claus, Fred Charles (Assoc. M. '24; M. '41), Location Engr., State Highway Dept., State House Annex (Res., 933 Bellevue Ave.), Trenton, N.J.

Coombe, John Van Veghten (Jun. '34; Assoc. M. '41), Care, U.S.N., David W. Taylor Model Basin, Washington, D.C.

Crooks, James Graham (Jun. '29; Assoc. M. '41), Lt. (jg), CEC, U.S.N., Asst. to Design Mgr., Bureau of Yards and Docks, 4422 Navy Bldg., Washington, D.C.

Deane, William Francis (Jun. '30; Assoc. M. '41), U.S.S. Hydrographer, U.S. Coast and Geodetic Survey, Pensacola, Fla.

Dobbs, Melvin Arthur (Jun. '34; Assoc. M. '41), San. Engr., East Side Health Dist., 325 East Broadway, East St. Louis, Ill.

Donnelly, Jack Aden (Jun. '29; Assoc. M. '41), Asst. Works Engr., Leetsdale Works, Bethlehem Steel Co., Oliver Bldg., Pittsburgh, Pa.

Dougherty, Donald Fix (Jun. '32; Assoc. M. '41), Asst. Engr., Water Resources Branch, U.S. Geological Survey, Box 2052, Jackson, Miss.

Edward, Frank William (Jun. '30; Assoc. M. '39; M. '41), Wyoming, Iowa.

Enger, Walter Melvin (Jun. '35; Assoc. M. '41), Lt. (jg), CEC, U.S.N.R., Insp. of Naval Materials, 4521 Produce Plaza, Vernon (Res., 140 North Park Ave., Montebello), Calif.

Everham, Arthur Thompson (Jun. '38; Assoc. M. '41), (Everham Foundation Co.), 4457 Telegraph Rd., Los Angeles, Calif.

French, John Lawrence (Jun. '38; Assoc. M. '41), Asst. Engr., U.S. Geological Survey, Box 1254, High Point, N.C.

Garnett, Raymond Raithel (Jun. '38; Assoc. M. '41), Engr. (Civ.), U.S. Engr. Office, 751 South Figueroa St., Los Angeles, Calif.

Gidley, Harry Kenneth (Jun. '29; Assoc. M. '41), Associate Engr., State Dept. of Health, Capitol Bldg., Charleston, W.Va.

Hankins, Lawrence Donald (Jun. '33; Assoc. M. '41), Asst. Topographic Engr., U.S. Geological Survey, Box 386, Coeur d'Alene, Idaho.

Harding, Robert Carnegie (Jun. '33; Assoc. M. '41), Associate Agri. Engr., Indian Service, U.S. Dept. of Interior, 607 Goodrich Bldg. (Res., 2030 North Dayton), Phoenix, Ariz.

Hart, Robert Winston (Jun. '31; Assoc. M. '41), Asst. Civ. Engr., U.S. Coast Guard, 327 Customhouse (Res., 1223 Napoleon Ave.), New Orleans, La.

Hollenbeck, Leo Edward (Jun. '31; Assoc. M. '41), Asst. Engr., U.S. Engr. Dept., 415 Post Office and Court House, Norfolk (Res., 410 Sixteenth St., Virginia Beach), Va.

Hunt, Theodore William (Jun. '33; Assoc. M. '41), Junior Engr., U.S. Engr. Office, Security Mutual Bldg., Binghamton, N.Y.

Leba, Theodore, Jr. (Jun. '35; Assoc. M. '41), 1st Lt., Corps of Engrs., U.S. Army, Company F, 151st Engr. Regiment (Combat), Camp Claiborne, La. (Res., 1426 Central Ave., Apt. 202, Memphis, Tenn.)

Lepp, John (Jun. '35; Assoc. M. '41), 1st Lt., Corps of Engrs., U.S. Army, Anniston Ordnance Depot, Anniston, Ala.

Martin, Earl Howard (Jun. '35; Assoc. M. '41), 1st. Lt., 71st Engr. Company (Livens Projector), U.S. Army, Fort Benning, Ga. (Res., 695 South Court St., Medina, Ohio.)

Mason, John Leslie (Assoc. M. '30; M. '41), Lt. Comdr., CEC, U.S.N.R., Bureau of Yards and Docks, Washington, D.C.

Packard, Daniel Berry, Jr. (Jun. '31; Assoc. M. '41), Senior Asst. Engr., Atlantic Coast Line R.R., Gen. Office, Wilmington, N.C.

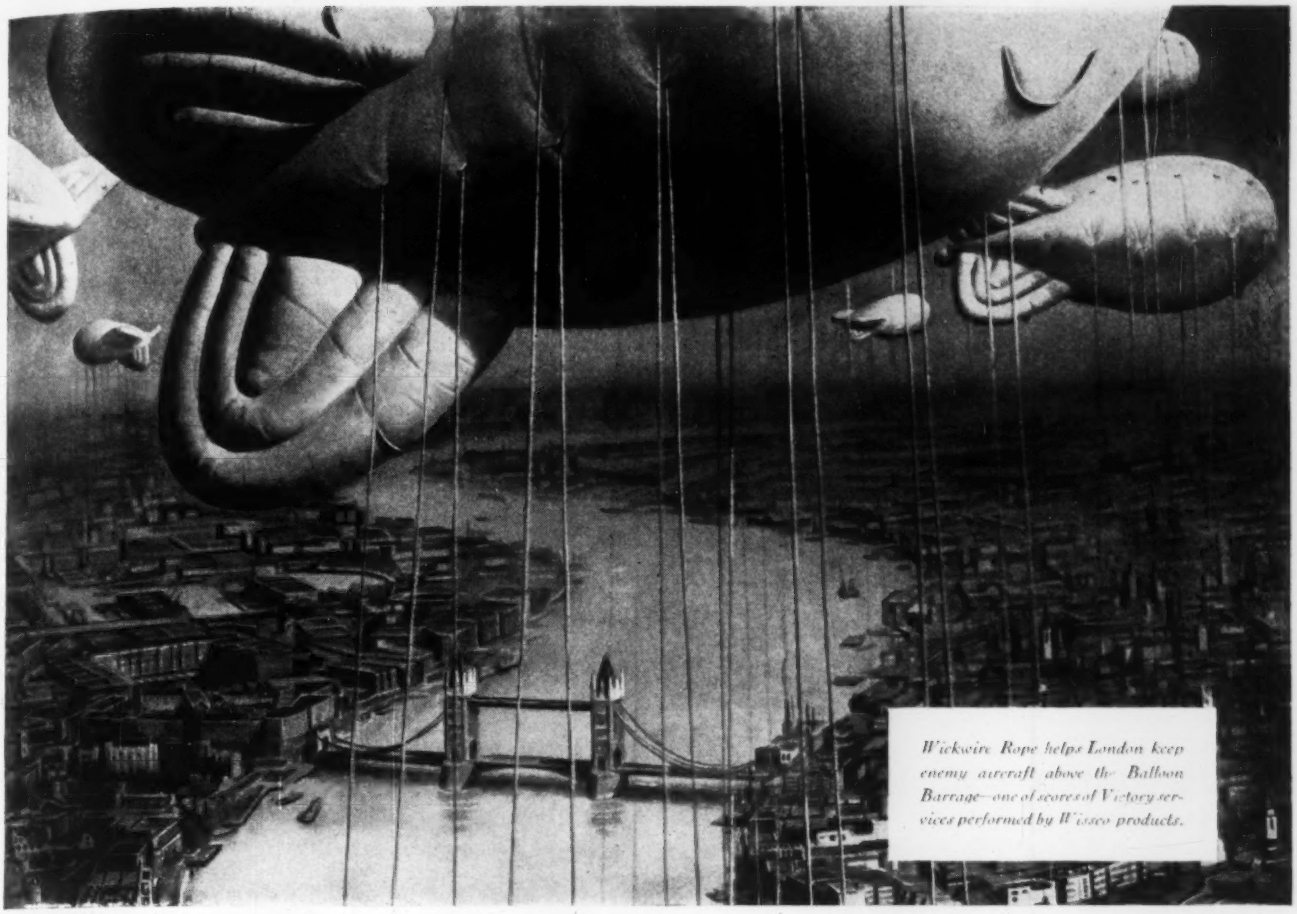
Peacock, Frederic Lockwood (Assoc. M. '21; M. '41), Lt. Comdr., U.S. Coast and Geodetic Survey, Washington, D.C.

Richardson, Rex Densmore (Assoc. M. '09; M. '41), Pres., R. D. Richardson Constr. Co., 828 Connell Bldg., Scranton, Pa.

Sanger, Frederick James (Assoc. M. '37; M. '41), Head, Dept. of Eng. and Building, Henry Lester Inst. of Technical Education, 505 East Seward Rd., Shanghai, China.

Sheridan, Arthur Vincent (Assoc. M. '20; M. '41), Planning Commr., City of New York, Municipal Bldg. (Res., 5400 Fieldston Rd.), New York, N.Y.

Silvestri, Joseph Paul (Jun. '29; Assoc. M. '41), Supt., San Mateo Feed & Fuel Co., 850



Wickwire Rope helps London keep enemy aircraft above the Balloon Barrage—one of scores of Victory services performed by Wissco products.

A Message About Wire Rope

FROM LONDON'S BALLOON BARRAGE!

Here is a vital message written in steel upon the skies over London . . . where a single order for 587 miles of Wickwire Rope now adds its bit in protecting a great city from dive bombers.

Every foot of that wire rope is an eloquent argument in itself, speaking directly to every user of wire rope—whether used for war, or for essential civilian services.

The message is: VICTORY NEEDS *STEEL!* Victory needs night and day all-out efficiency in every industrial operation. Wire rope that fails too soon wastes steel. The time wasted replacing it is a red stop light on Victory.

You can speed Victory by using wire rope of the correct size and type for your service . . . *then by taking proper care of it, so that it lasts.*

The long life of Wickwire Rope begins with skillful production of the metal in our own blast furnaces. It continues through proud care and precision methods in drawing the wire, and laying the rope. Wickwire representatives give expert help in advising on the best type of rope for each use. And after delivery, Wickwire Service in the field continues to work with you, to assure longest life on the job.

• • •

Our authoritative "KNOW YOUR ROPES" manual, on the selection, application and usage of wire rope, has profited more than 25,000 rope users. Ask for your copy today. Write Wickwire Spencer Steel Company, 500 Fifth Avenue, New York, N. Y.

A FOOT OFF may make your rope last longer. Constant bending and unbending around a sheave will finally wear out any rope. A foot off the rope redistributes the wear. This and forty more rope life-savers are pictured and described in our booklet, "Know Your Ropes."

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER

WICKWIRE — WICKWIRE SPENCER STEEL COMPANY

WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

WS WISSCO PRODUCTS

San Mateo Drive (Res., 220 Castillian Way), San Mateo, Calif.

Smith, Wilbur Stevenson (Jun. '37; Assoc. M. '41), Traffic Engr., State Highway Dept. (Res., 3100 Heyward St.), Columbia, S.C.

Tatlow, Richard Henry, III (Assoc. M. '34; M. '41), Member, Constr. Advisory Committee, War Dept., Washington, D.C. (Res., 8 Virgilia St., Chevy Chase, Md.)

Thomas, Robert Scofield (Jun. '32; Assoc. M. '41), Lt. (jg), CEC, U.S.N.R., Room 353 Federal Office Bldg., San Francisco (Res., 1384 East 31st St., Oakland), Calif.

REINSTATEMENTS

Campbell, Benjamin Lucien, M., reinstated Jan. 1, 1942.

Foulks, John Aubrey, M., reinstated Jan. 6, 1942.

Imperiale, Michael Aloysius, Jun., reinstated Jan. 1, 1942.

Kaminsky, Constantin Denis, Assoc. M., reinstated Jan. 7, 1942.

Larkin, Edward Leo, Assoc. M., reinstated Jan. 7, 1942.

Memory, Duncan Thomas, Assoc. M., reinstated Jan. 1, 1942.

Nagle, John Marion, M., reinstated Jan. 7, 1942.

Ogden, Horatio Nash, Jun., reinstated Jan. 1, 1942.

Shoemaker, Theodore, Assoc. M., reinstated Jan. 1, 1942.

Steeg, Henry Bell, Assoc. M., reinstated Jan. 1, 1942.

Van Vleck, Albion Noyes, M., reinstated Jan. 1, 1942.

RESIGNATIONS

Allen, Leonard Barnes, M., resigned Dec. 31, 1941.

Beekman, Henry Alexander, Jun., resigned Dec. 31, 1941.

Blair, John Cambelton, Jun., resigned Dec. 31, 1941.

Coombs, Donald Gladstone, M., resigned Dec. 31, 1941.

Coon, Emmett John, Assoc. M., resigned Dec. 31, 1941.

Corson, Alan, M., resigned Dec. 31, 1941.

Di Lorenzo, Antonio Vincent Carmine, Jun., resigned Dec. 31, 1941.

Dopp, Robert Henry, Jun., resigned Dec. 31, 1941.

Dwyer, Eugene Michael, Assoc. M., resigned Dec. 31, 1941.

Edwards, Robert Fielding, Assoc. M., resigned Dec. 31, 1941.

Ellis, Herbert Cram, Assoc. M., resigned Dec. 31, 1941.

Fuller, Raymond Stiles, M., resigned Dec. 31, 1941.

Harvey, Thomas Ascough, Jun., resigned Dec. 31, 1941.

Horton, Charles Henry, Jun., resigned Dec. 31, 1941.

Howe, Wilson Tyler, M., resigned Dec. 31, 1941.

Kiger, Wallace Lee, Jun., resigned Dec. 31, 1941.

Kurz, Ernst William, Assoc. M., resigned Dec 31, 1941.

Landsiedel, William, Assoc. M., resigned Dec 31, 1941.

Losh, Albert Richard, Assoc. M., resigned Dec 31, 1941.

Miller, Hiram, M., resigned Dec. 31, 1941.

Quattlebaum, Selby, Assoc. M., resigned Dec 31, 1941.

Schaidt, Leander, M., resigned Dec. 31, 1941.

Smith, Herbert Campbell, M., resigned Dec 31, 1941.

Stephenson, James, M., resigned Dec. 31, 1941

Stoner, Harry Leroy, Assoc. M., resigned Dec 31, 1941.

Taylor, Philip Weston, M., resigned Dec. 31, 1941.

Taylor, Wyllys Hard, M., resigned Dec. 31, 1941.

Tewinkel, Garrett Carper, Jun., resigned Dec. 31, 1941.

Watkins, Robert Bruce, Jun., resigned Dec 31, 1941.

Winston, Charles A., M., resigned Dec. 10, 1941.

Wissing, John Lee, M., resigned Dec. 31, 1941.

Wright, Edwin Hanscom, M., resigned Dec. 31, 1941.

Applications for Admission or Transfer

Condensed Records to Facilitate Comment from Members to Board of Direction

February 1, 1942 NUMBER 2

The Constitution provides that the Board of Direction shall elect or reject all applicants for admission or for transfer. In order to determine justly the eligibility of each candidate, the Board must depend largely upon the membership for information.

Every member is urged, therefore, to scan carefully the list of candidates published each month in CIVIL ENGINEERING *and to furnish the Board with data which may aid in determining the eligibility of any applicant.*

It is especially urged that a definite recommendation as to the proper grading be given in each case, inasmuch as the grading must be based upon the opinions of those who know the applicant personally as well as upon the nature and extent of his professional experience. Any facts derogatory to the personal character or professional reputation of an applicant should be promptly communicated to the Board.

Communications relating to applicants are considered strictly confidential.

The Board of Direction will not consider the applications herein contained from residents of North America until the expiration of 30 days, and from non-residents of North America until the expiration of 90 days from the date of this list.

MINIMUM REQUIREMENTS FOR ADMISSION

GRADE	GENERAL REQUIREMENT	AGE	LENGTH OF ACTIVE PRACTICE	RESPONSIBLE CHARGE OF WORK
Member	Qualified to design as well as to direct important work	35 years	12 years	5 years RCM*
Associate Member	Qualified to direct work	27 years	8 years	1 year RCA*
Junior	Qualified for sub-professional work	20 years	4 years	
Affiliate	Qualified by scientific acquirements or practical experience to cooperate with engineers	35 years	12 years	5 years RCM*

* In the following list RCA (responsible charge—Associate Member standard) denotes years of responsible charge of work as principal or subordinate, and RCM (responsible charge—Member standard) denotes years of responsible charge of IMPORTANT work, i. e., work of considerable magnitude or considerable complexity.

APPLYING FOR MEMBER

Abbey, Evers, Washington, D.C. (Age 47) (Claims RCA 12.5 RCM 5.0) Sept. 1917 to date with Air Corps, U.S. Army, as Private, Corporal, 2d Lieut., 1st Lieut., Capt., Major, and (since July 1941) Lt. Col.

Agnew, David Reed, Chicago, Ill. (Age 43) (Claims RCA 6.6 RCM 5.5) July 1917 to date with Bates & Rogers Constr. Co., as Asst. to Gen. Supt., Contr.'s Engr., Contr.'s Supt., Job Supt., Asst. Gen. Supt., Gen. Foreman, Gen. Supt., and (since Nov. 1940) Representative.

Blaser, William Edward, Cleveland, Ohio. (Age 61) (Claims RCA 10.3 RCM 15.0) Sept. 1911 to date with Bridge Dept., Cuyahoga County Engr.'s Office, successively as Draftsman, Designing Engr., Chf. Draftsman, Acting Bridge Engr., Special Main Ave. Bridge Engr., County Bridge Engr., and (since Dec. 1941) Chf. Deputy County Engr.

Buck, Roy McGarvey (Assoc. M.), Boise, Idaho. (Age 53) (Claims RCA 12.5 RCM 8.8) Aug. 1935 to Oct. 1936 and Feb. 1937 to date with WPA as Project Engr., Engr.-Inspector, and (since July 1940) State Planning Engr.; in the interim Associate Engr., RA, Bonners Ferry, Idaho.

Catton, Miles Dewey (Assoc. M.), Chicago, Ill. (Age 43) (Claims RCA 12.1 RCM 7.0) Aug. 1926 to date with Portland Cement Association as Highway Engr., Highways & Municipal Bureau, and Development Dept., and (since Jan. 1941) Mgr., Soil-Cement Bureau, and Highway Engr., Development Dept.

Dye, Forrest Leslie (Assoc. M.), Diablo Heights, Canal Zone. (Age 35) (Claims RCA 3.9 RCM 7.2) July 1940 to date with Special Eng. Div., The Panama Canal, as Chf., Dredging Sub-Sec.; previously with U.S. Engr. Office, Memphis, Tenn., as Dredging Inspector, Supt. of dredging in vicinity of Island 35, Tenn., Prin. Asst. to Chf. of Dredging Sec., Prin. Operations Asst., and in charge of Dredging Planning Sub-Sec.

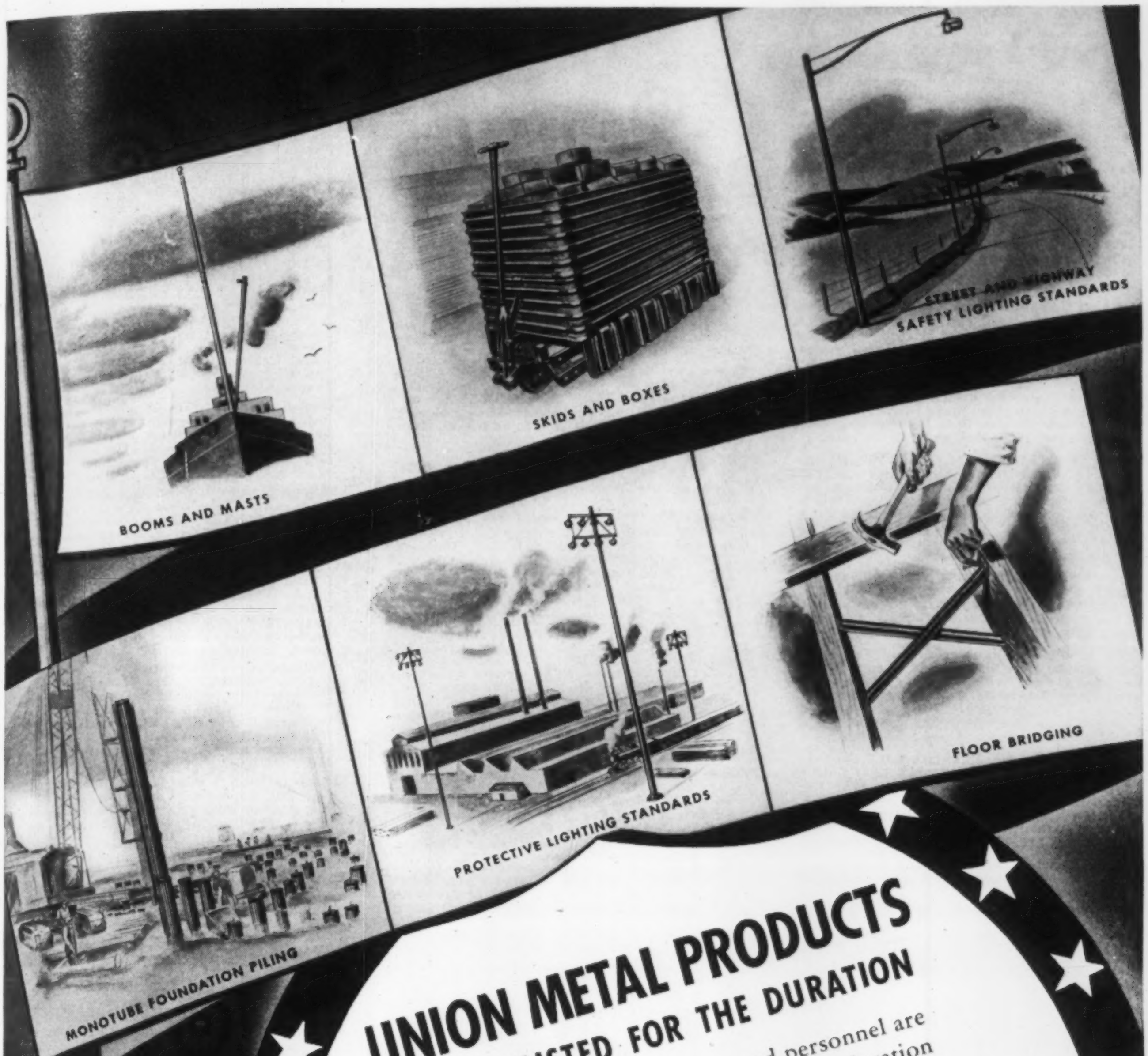
Fox, Milo Pitcher, Vicksburg, Miss. (Age 54) (Claims RCA 3.5 RCM 22.0) 1912 to date with Corps of Engrs., U.S. Army, as Lieut., Capt. Major, Lt. Col., and (since 1941) Col.

Freeman, Philip Drew, LaGrange, Ill. (Age 43) (Claims RCA 9.1 RCM 6.2) Aug. 1938 to Aug. 1939 Designing Engr., and Sept. 1941 to date Res. Engr., Consoer, Townsend and Quinlan, Chicago, Ill.; in the interim Structural Engr., Div. of Superhighways, Cook County Highway Dept.; previously Asst. Engr., Illinois Bureau of Bridges, Springfield.

Goodwin, James William (Assoc. M.), Birmingham, Ala. (Age 37) (Claims RCA 2.7 RCM 7.0) June 1935 to date owner of firm, J. W. Goodwin Eng. Co., Mun. and Cons. Engrs.

Harley, George Foster, Fort Worth, Tex. (Age 66) (Claims RCA 9.5 RCM 22.8) June 1941 to date Regional Director, U.S. Defense Public Works, FWA, Region 4; previously with PWA as Engr. Examiner, Prin. Engr., and Project Engr.

Holman, Jacob Charles, New York City. (Age 54) (Claims RCA 8.8 RCM 20.0) March 1925 to date Pres. and Gen. Mgr., Holman Constr. Co., Inc.


BOOMS AND MASTS
SKIDS AND BOXES
STREET AND HIGHWAY
SAFETY LIGHTING STANDARDS
FLOOR BRIDGING
PROTECTIVE LIGHTING STANDARDS
MONOTUBE FOUNDATION PILING
PRACTICE BOMBS

UNION METAL PRODUCTS
HAVE ENLISTED FOR THE DURATION

● Union Metal products, plants and personnel are at the disposal of our government for the duration of the emergency. To date, our efforts have been confined to producing the items illustrated above for defense purposes. All will be needed in even greater quantities in the months to come and, as the demand for other steel specialties broadens, we will adapt our facilities to meet each and every problem to the utmost.

America has served Union Metal well during its 35 years of existence. It's a privilege to pledge our all-out effort in return!

THE UNION METAL MANUFACTURING CO.
Canton, Ohio

Lochak, Boris, Geneva, N.Y. (Age 40) (Claims RCA 1.3 RCM 11.8) Oct. 1941 to date Asst. to Inside Supt., Seneca Ordnance Depot, Kendaia, N.Y.; July to Oct. 1941 travelling; previously Cons. Engr. (professional basis).

Locraft, Bernard Francis (Assoc. M.), Chevy Chase, Md. (Age 39) (Claims RCA 4.5 RCM 12.0) Jan. 1921 to date with James Berrall, Washington, D.C., in various capacities, since Oct. 1936 being member of firm, Berrall & Locraft.

Martin, Robert Gilbert, Beverly Hills, Calif. (Age 52) (Claims RCM 21.0) 1925 to 1928 and 1937 to date in private practice as Civ. Engr.; in the interim with Bureau of Water-Works and Supply, Los Angeles, Calif.

Meyer, John William, Blytheville, Ark. (Age 43) (Claims RCA 10.3 RCM 6.6) Jan. 1928 to date Chf. Engr., Drainage Dist. No. 17, Mississippi County, Ark.

Murphy, Howard Austin, Geneva, N.Y. (Age 53) (Claims RCA 10.0 RCM 9.8) Nov. 1940 to date Senior Engr. with William S. Lozier, Archts.-Engrs.; previously Res. Engr., Niagara Frontier Planning Board, U.S. Army Engrs.

Nelson, Herman Lemar, Huntsville, Ala. (Age 41) (Claims RCA 8.5 RCM 8.1) Sept. 1920 to date with Alabama State Highway Dept. as Instrumentman, Res. Engr., Constr. Engr., and (since March 1939) Res. Engr.

Nubar, Yves (Assoc. M.), New York City. (Age 42) (Claims RCA 6.4 RCM 10.7) Oct. 1937 to date Cons. Engr. in private practice; also Engr. with Arch Roof Constr. Co., and American Bridge Co., Chf. Engr., Wilcox and Erickson, Cons. Engrs.; previously Associate Engr. on design and supervision, U.S. Treasury, Procurement Div.

Ortolani, Walter Albert (Assoc. M.), Omaha, Tex. (Age 40) (Claims RCA 6.2 RCM 7.0) Nov. 1932 to date with Texas Highway Dept., as Asst. Res. Engr., Res. Engr., and (at present) Senior Res. Engr., Morris County.

Othus, Percy Monroe, Portland, Ore. (Age 49) (Claims RCA 8.4 RCM 10.0) June 1941 to date Asst. Engr. with John W. Cunningham & Associates, Lawrence & Allen, Archts. Engrs., Albany, Ore.; previously with Shell Oil Co., as Constr. Engr., Asst. Supt. and Supt. of Constr. and Maintenance, and Operations Manager.

Parkinson, Charles Francis, Salt Lake City, Utah. (Age 41) (Claims RCM 13.6) 1940 to date with Smith, Hinchman, Grylls, Inc., Engrs.-Archts., Detroit, as Mechanical Engr.; previously Operating Engr. in charge of a General Motors Corporation power plant; Mechanical Engr. for Hiram Walker, Inc.

Rayner, William Horace (Assoc. M.), Urbana, Ill. (Age 57) (Claims RCA 14.0 RCM 6.3) 1911 to date at Univ. of Illinois, as Instructor, Associate in Civ. Eng. (4 years), Asst. Prof. of Surveying (10 years), and (since Sept. 1928) Asst. Prof. of Civ. Eng.

Smith, Patrick Benton, Memphis, Tenn. (Age 39) (Claims RCA 7.0 RCM 7.8) June 1941 to date Chf. Engr. of Constr., Schulz & Norton; July 1940 to June 1941 member of firm, Hunter & Smith, Cons. Engrs., Oklahoma City, Okla.; previously Res. Engr., Chf. Res. Engr., and Engr. Examiner, PWA, Topeka and Kansas City, Kans., and Fort Worth, Tex.

Stahl, Harry Herman, Brookline, Upper Darby, Pa. (Age 49) (Claims RC 26.7 D 26.7) May 1922 to date Designing Engr., Belmont Iron Works, Engrs. and Fabricators, Philadelphia.

Taylor, Albert Davis, Cleveland, Ohio. (Age 58) (Claims RCM 17.8) 1915 to date in private practice as Landscape Archt. and Town Planner.

Walker, Carl Clayton, Columbus, Ohio. (Age 47) (Claims RCA 7.4 RCM 18.1) Jan. 1922 to date general civil engineering practice, The Jennings-Lawrence Co.

Wilson, James, Melbourne, Victoria, Australia. (Age 42) (Claims RCA 4.6 RCM 15.1) Sept. 1938 to date in private practice as Chartered Cons. Civ. and Elec. Engr.; previously in charge of design office, Scott and Furphy, Cons. Civ. Engrs., Melbourne; Civ. Eng. Designer, Vacuum Oil Co., Johns and Waygood, and Malcolm Moore, Ltd.

Wingard, James Hoyt, Fort Knox, Ky. (Age 45) (Claims RC 16.9 D 2.2) Nov. 1932 to date with U.S. War Dept., as Inspector, Chf. Inspector, Engr., Senior Engr., and Supt. of Constr.

Young, Dana (Assoc. M.), Storrs, Conn. (Age 37) (Claims RCA 6.3 RCM 7.0). Feb. 1934 to date Prof. and Head, Dept. of Civ. Eng., Univ. of Connecticut.

Young, William Nelson, West New Brighton, N.Y. (Age 43) (Claims RCA 6.6 RCM 15.8) Sept. 1916 to date with Baltimore & Ohio R.R., as Chainman, Rodman, Levelman, Transitman, Field Engr., and (since March 1929) Asst. Engr.

APPLYING FOR ASSOCIATE MEMBER

Bauwens, George Otto Paul, Los Angeles, Calif. (Age 54) (Claims RCA 22.8) Aug. 1938 to date Asst. Prof. of Civ. Eng., Univ. of Southern California; previously on private engineering in Pasadena, Calif.; with Metropolitan Water Dist. of Los Angeles and Imperial Canal Construction (Morrison and Knudson Co.).

Brumbaugh, John Ernest (Junior), Briarcliff Manor, N.Y. (Age 32) (Claims RCA 4.3) Sept. 1940 to date Village Engr., Briarcliff Manor, N.Y.; previously Asst. Engr., Larchmont, N.Y.

Burnett, Douglas Harold (Junior), Palo Alto, Calif. (Age 32) (Claims RCA 5.5) Jan. 1934 to date as Asst. Engr., Standard Oil Co. of California.

Causby, Allen, Tyler, Tex. (Age 37) (Claims RCA 9.1) April 1938 to date Sales Engr., Armo Drainage & Metal Products, Inc., Houston, Tex.; previously Asst. Civ. Engr. (Civil Service), and Project Supt., U.S. Forest Service.

Cortright, Harry Miller (Junior), Oxford, Miss. (Age 33) (Claims RCA 8.1) Dec. 1938 to date Associate Hydr. Engr. (Civil Service), U.S. Forest Service, Dept. of Agriculture; previously Jun. Hydr. Engr., and Asst. Hydr. Engr., TVA.

Cranley, Edward Patrick (Junior), Chicago, Ill. (Age 32) (Claims RCA 4.1 RCM 1.1) Aug. 1935 to date with Architect of Board of Education, Chicago, Ill., as Architectural Estimator, Project Engr., and (since Jan. 1941) Supt. of Maintenance.

Crawford, Glenn Arthur (Junior), Burbank, Calif. (Age 32) (Claims RCA 1.9 RCM 4.5) Sept. 1937 to date with City of Burbank, Calif., as Draftsman, Designing Draftsman, and (since Oct. 1940) Senior Eng. Aide; previously Sanitation Inspector, Los Angeles County Surveyor, Constr. Div.

Davis, John Taylor, Anniston, Ala. (Age 36) (Claims RCA 11.4 RCM 2.9) March 1941 to date Chf. Draftsman, J. B. Converse & Co. Inc., and A. C. Polk, Cons. Engrs., Anniston, Ala.; previously Engr., Solomon & Keis, Cons. Engrs., Troy, N.Y.; Asst. to Chf. Draftsman, New York Power & Light Corporation, Albany; Structural Engr. with J. Russell White, Archt., Albany, N.Y.

Dees, Ben Woodall (Junior), Little Rock, Ark. (Age 32) (Claims RCA 5.2) Aug. 1941 to date Supervisor, Structural Dept., Ford, Bacon and Davis; May to Aug. 1941 Structural Engr., Holway and Cochrane, Engrs., Tulsa, Okla.; previously Draftsman and Bridge Designer, Arkansas Highway Comm.

Egbert, Ford (Junior), Galveston, Tex. (Age 32) (Claims RCA 4.9) Nov. 1937 to date with U.S. Engrs., as Jun. Eng. Aide (Civ.), Asst. Eng. Aide (Civ.), and (since Nov. 1939) Jun. Engr. (Hydr.); previously with SCS, U.S. Dept. of Agriculture.

Falstad, Gunnar, Norris, Tenn. (Age 49) (Claims RCA 13.6) May 1936 to date with TVA, Knoxville, Tenn., as Asst. Engr., Associate Engr., and (since July 1941) Civ. Engr.

Fox, Portland Porter, Gilbertsville, Ky. (Age 33) (Claims RCA 6.2) Oct. 1934 to date with TVA, as Jun. Asst., Senior Geologic Aide, Associate and Geologist.

Friedman, Sam, Los Angeles, Calif. (Age 30) (Claims RCA 3.6) May 1939 to date with U.S. Army Engrs., as Jun. Engr. (Structural Grade), and (since May 1941) Asst. Engr. (Structural Grade); previously Gen. and Topographic Draftsman, City Planning Dept., Los Angeles; Estimator and Detailer, Usona Iron Co., Los Angeles.

Fry, Shirley Glen, Sherman, Tex. (Age 30) (Claims RCA 4.9) Aug. 1929 to date with Texas Highway Dept., as Checker, Rodman, Levelman, Instrumentman, Office Engr., and (since May 1940) Field Engr.

Fuller, Harry Lawrence, Kansas City, Mo. (Age 45) (Claims RCA 10.4 RCM 9.9) 1941 to date Associate Engr., Burns & McDonnell Eng. Co.; previously Sales Representative, Dresser Mfg. Co., Bradford, Pa.; Res. Engr. Inspector, PWA.

Gettys, Paul Eugêne (Junior), Ingram, Pa. (Age 33) (Claims RCA 2.7 RCM 3.2) July 1930 to date with U.S. Engrs., Pittsburgh, Pa., as Surveyman, Inspector, Jun. Engr., Asst. Engr., and (since Nov. 1938) Associate Engr.

Goudeau, Morgan Jefferson, Jr., Opelousas, La. (Age 36) (Claims RCA 12.5) Jan. 1934 to date in general engineering practice.

Hamilton, Donald Mackenzie (Junior), Edinburgh, Scotland. (Age 30) (Claims RCA 4.3 RCM 0.7) April 1937 to date Asst. Engr., Meik & Halcrow, London; previously Asst. Engr., Lewis & Lewis, London, England.

Harris, Jerome Dee, San Antonio, Tex. (Age 35) (Claims RCA 3.5 RCM 1.2) Aug. 1941 to date Paving Engr., Lockwood & Andrews and David M. Duller, Cons. Engrs., San Jacinto Ordnance Depot, Houston, Tex.; previously Field Engr., Texas Highway Dept.

Hill, Jacob Ernest (Junior), Colville, Wash. (Age 32) (Claims RCA 5.9) May 1934 to date with U.S. Bureau of Reclamation, as Transitman, Asst. Engr. (Grades 10 and 11), and (since May 1940) Associate Engr. (Grade 12).

Joines, Glenn Vivican, Manhattan, Kans. (Age 34) (Claims RCA 6.5 RCM 0.8) Jan. 1934 to date with Kansas Highway Comm., as Materials Inspector, Soils Investigator, Div. Materials Engr., and (since April 1941) Senior Engr.

Kellogg, Frederic Hartwell, Knoxville, Tenn. (Age 37) (Claims RCA 7.2 RCM 3.2) Dec. 1934 to date with TVA, as Asst. Engr., Associate Engr., Engr., and (since March 1941) Senior Engr.

Kendall, Nathaniel James (Junior), Fort Richardson, Alaska. (Age 32) (Claims RCA 2.2 RCM 4.1) May 1941 to date Capt., Ordnance Dept., U.S. Army; previously Asst. Engr., California Water Service Co., San Jose; Jun. Engr., Standard Oil Co. of California, San Francisco.

Lane, Kenneth Stacy (Junior), Providence, R.I. (Age 32) (Claims RCA 4.1) July 1939 to date Associate Engr., U.S. Engr. Office; previously at Harvard Univ., as Graduate Student and Research Asst.; Structural Designer, Stone & Webster Eng. Corporation.

Leonard, Raymond Wesley (Junior), Asheville, N.C. (Age 32) (Claims RCA 1.6) Nov. 1936 to date with U.S. Geological Survey, as Jun. Hydr. Engr., Water Resources Branch, and (since Nov. 1941) Asst. Hydr. Engr.

Machin, Edwin Gilbert, Hope, Ark. (Age 45) (Claims RCA 19.0)Aug. 1941 to date Supt. of Roads, W. E. Callahan Constr. Co.; previously Supt. of Constr., successively with Indiana Road Paving Co. ($9^{2}/_{5}$ years), G. R. Barr, Contr. (3 years), and as member of firm, Barr-Machin Constr. Co. ($4^{3}/_{5}$ years).

McAdams, Leonard James, Carterville, Ill. (Age 40) (Claims RCA 20.8) 1941 to date Chf. Materials Engr., also Progress Engr., with Chas. W. Cole & Son, Archt. and Engr., Illinois Ordnance Plant; 1940 to 1941 Asst. Res. Engr. with Alvord, Burdick & Howson, Chicago, Ill.; previously Area Engr., WPA, Jefferson, City, Mo.

Moore, Gerald Dixon (Junior), New York City. (Age 33) (Claims RCA 10.2) Oct. 1936 to date Inspector of Real Estate and Real Estate Appraiser with Emigrant Industrial Savings Bank, New York City.

Murer, Eldred Beverly (Junior), Clayton, Mo. (Age 33) (Claims RCA 3.4 RCM 1.5) March 1939 to date with A. Y. Taylor and Co., as Chf. Project Engr. and Direct Asst. to A. Y. Taylor, Chf. Engr., and (since June 1940) member of, and at present owner of firm; previously with Sverdrup and Parcel, Cons. Engrs., St. Louis, as Draftsman, Detailer, Asst. Designer, Asst. Res. Engr., and Res. Engr.

Ogilvie, Thomas Whyte, Susanville, Calif. (Age 51) (Claims RCA 23.5 RCM 2.0) Jan. 1935 to date County Engr., Lassen County, Calif., being Chf. Engr. and Supt. of Susanville and Milwood San. Dist.; at present also Acting Chf. Engr. for Red River Lumber Co., Westwood, Calif.

Parsons, James Dana, Croton-on-Hudson, N.Y. (Age 32) (Claims RC 3.0 D 0.7) Oct. 1940 to date in charge of soil mechanics laboratories and testing for Moran, Proctor, Freeman & Mueser, Cons. Engrs., New York City; previously Asst. Engr., Parsons, Klapp, Brinckerhoff & Douglas; with Foundation Dept., New York World's Fair of 1939, Inc., Flushing, N.Y.

Patterson, Archibald Oscar (Junior), Chattanooga, Tenn. (Age 33) (Claims RCA 6.6 RCM 2.9) Sept. 1930 to date with U.S. Geological Survey, as Jun. Hydr. Engr., Asst. Hydr. Engr., and (since June 1940) Associate Hydr. Engr.

Pike, Thomas Oliver (Junior), Diablo Heights, Canal Zone. (Age 32) (Claims RCA 3.8) July 1940 to date with Special Engr. Div., The Panama Canal, as Asst. Structural Engr., and (since Oct. 1941) Associate Structural Engr.; previously with U.S. Engr. Office, as Dredging Inspector, Surveyman and Jun. Engr.

Pratt, Alma (Junior), Fort Duchesne, Utah. (Age 29) (Claims RCA 3.4) Jan. 1940 to date Road Engr., Uintah and Ouray Agency; previously with Carson Indian Agency, Stewart, Nev., as Jun. Road Engr. and Road Engr.

Quiriconi, Eugene (Junior), New York City. (Age 33) (Claims RCA 2.9 RCM 0.2) Dec. 1941 to date Designing Engr., The Ferber Co., Engrs. and Bldrs., Hackensack, N.J.; Jan. 1939 to Dec. 1941 Structural Draftsman, Grade 4, Office of Engr. of Highways, Borough Pres. of Queens; previously Structural Draftsman, Grade 3, Board of Transportation, New York City.

when you require
WATER TIGHTNESS
STRENGTH
HIGH CARRYING CAPACITY ✓
LONG LIFE
LOW MAINTENANCE
OVERALL ECONOMY
in a pipe line
remember **LOCK JOINT**

USERS SAY "NO MAINTENANCE"

Water works engineers report "Maintenance nothing"—"Line never shut down for repairs"—"No maintenance to date" on Lock Joint Reinforced Concrete Pressure Pipe Lines after eighteen, twenty, and twenty-six years of service. This is conclusive proof that maintenance is an absolute minimum. Here are the reasons:

The conservative design of Lock Joint Pipe providing a high factor of safety against sudden surges and overloads—the flexibility of the watertight expansion joints—the inherent characteristic of concrete to completely and permanently resist corrosion and tuberculation—and the years of experience of Lock Joint Engineers, Superintendents and Foremen, not only in the design and manufacture of the pipe, but also in its installation on large water works projects—all these assure a job well done and of lasting quality.

LOCK JOINT PIPE COMPANY

Established 1905

AMPERE, NEW JERSEY

BRANCH OFFICES

Denver, Colo.
White Plains, N. Y.
Kansas City, Mo.
Hartford, Conn.
Chicago, Ill.
Valley Park, Mo.
Rock Island, Ill.
Navarre, Ohio
Kenilworth, N. J.
Cleveland, Ohio

LOCK JOINT *Reinforced Concrete* PRESSURE PIPE

PRESSURE SUBAQUEOUS
SEWER CULVERT

2-LJ-2

SACK, ADAM FRANCIS (Junior), Baltimore, Md. (Age 33) (Claims RCA 3.0) Oct. 1940 to date Utilities Draftsman, Whitman, Requardt & Smith, Edgewood Arsenal, Md.; previously Transitman, and Detail Draftsman, Bethlehem Steel Co., Sparrows Point, Md.

SAMUELS, ABRAHAM SOLOMON, New York City. (Age 34) (Claims RCA 4.8) May 1938 to date with New York City Tunnel Authority as Eng. Asst., Acting Chf. of Party, and Inspector; previously Eng. Asst., with Board of Transportation, New York City.

SCOTT, ROBERT DAY, Washington, D.C. (Age 32) (Claims RCA 2.8) March 1938 to date with FHA as Jun. Engr., Asst. Structural Engr., and (since April 1941) Associate Structural Engr.; previously Eng. Field Clerk, PWA.

SEARCY, JAMES KINCHEON (Junior), Jackson, Miss. (Age 32) (Claims RCA 2.5 RCM 0.5) April 1935 to Nov. 1940 and Nov. 1941 to date with U.S. Geological Survey as Jun. Engr. (Hydr.), and (since July 1938) Asst. Engr. (Hydr.); in the interim Capt., CA, U.S. Army.

SEYMOUR, HAROLD JAMES, Elizabeth, N.J. (Age 51) (Claims RCA 26.8) April 1915 to date with City of Elizabeth, N.J., as Chf. Asst. City Engr.

SNYDER, FRANKLIN FARISON (Junior), Washington, D.C. (Age 31) (Claims RCA 5.3 RCM 2.4) Feb. 1940 to date Associate Hydr. Engr., U.S. Weather Bureau; previously Hydr. Engr., Pennsylvania Dept. of Forests and Waters; Jun. Hydr. Engr., TVA, Knoxville, Tenn.

STUART, WILBUR TENNANT (Junior), Safford, Ariz. (Age 32) (Claims RCA 6.4) Nov. 1936 to date with U.S. Geological Survey as Res. Engr., and (since May 1940) Asst. Engr., Ground Water Div.

SWEETON, ARTHUR WATSON, 3d (Junior), Hartford, Conn. (Age 28) (Claims RCA 3.8) June 1935 to date with City Eng. Dept., Bureau of Public Works, Metropolitan Dist., Hartford, Conn., as Asst. Inspector, Jun. Asst. Engr., and (since April 1938) Senior Asst. Engr.

TANIELIAN, MEGURDICH DAN, Brooklyn, N.Y. (Age 39) (Claims RCA 4.7) Oct. 1937 to Aug. 1938 Eng. Asst., and May 1939 to date Asst. Engr. (Grade 4) (Civ. Engr.), Board of Transportation, City of New York; in the interim Topographical Draftsman (Grade 4), Borough Pres. of Queens, Bureau of Sewers, Designs Div.

THIELHELM, HAROLD WILLIAM (Junior), Maracaibo, Venezuela. (Age 30) (Claims RCA 5.4 RCM 3.0) July 1937 to date with Lago Petroleum Corporation, Maracaibo, Venezuela, at present as Head Office Engr.; previously Lt., Engr. Corps, U.S. Army.

ULLMAN, SAMUEL LEHMAN, Santa Barbara, Calif. (Age 36) (Claims RCA 6.9 RCM 2.4) Oct. 1940 to date with Leeds, Hill, Barnard & Jewett as Asst. Engr. and Chf. Draftsman, Camp San Louis Obispo, and Asst. Dept. Head, Roads and R.R. Div., Camp Cooke, Calif.; previously with County of Santa Barbara, Calif. as Asst. Engr., with Planning Comm., and Road Dept.

VAN DE ERVE, JEROME (Junior), Washington, D.C. (Age 32) (Claims RCA 4.5) July 1931 to Feb. 1935 and March 1936 to date with U.S. Weather Bureau, as Aerological and Meteorological Asst., Asst. Hydrologic Supervisor, Office Engr., etc., and (since Dec. 1941) Asst. Meteorologist, Hydroclimatic Substations Sec., Station Operations Div.

VEIGEL, LOUIS WALTER (Junior), Dickinson, N.Dak. (Age 32) (Claims RCM 4.0) June 1933 to date City Engr., Dickinson, N.Dak., and County Surveyor, Stark County, N.Dak.; also, since Jan. 1938 Cons. Engr., on municipal improvements, etc.

WAGNER, LAWRENCE FREDERICK (Junior), Toms River, N.J. (Age 33) (Claims RCA 3.0) Sept. 1935 to date Prof. Engr. with County Engr., being Res. Engr. on construction of Ocean Gate water-supply system, and Mantoloking Bridge.

WEBBER, JOSEPH CARL, Toledo, Ohio. (Age 39) (Claims RCA 11.0) March 1938 to date with Div. of Eng. and Constr., City of Toledo, as Senior Engr., and (since Jan. 1941) Office Engr.-Design Engr.; previously Res. Engr., Toledo Terminal R.R.

APPLYING FOR JUNIOR

CRUMBLISS, ROY CHARLES, Chattanooga, Tenn. (Age 27) (Claims RCA 2.8) Nov. 1940 to date Draftsman, Hercules Powder Co.; previously Project Engr., Malaria Control, WPA; Rodman and Recorder, U.S. Geological Survey; Under Eng. Aide, TVA.

GIESE, LOUIS PAUL, Toledo, Ohio. (Age 26) (Claims RCA 3.8) Feb. to May 1938 Asst. Engr., Parks Dept., and April 1940 to date as Senior Eng. Draftsman, Engr. Dept., City of Toledo; in the interim Asst. Office Engr., and Office Engr. with Porter W. McDonnell.

HARDESTY, EGBERT RAILEY, New York City. (Age 26) 1940 B.C.E., Rens. Pol. Inst.; June 1940 to date Draftsman and Designer, with Waddell & Hardesty.

KUO, HSUAN, Ithaca, N.Y. (Age 29) At present candidate for Ph.D. from Cornell Univ.; July 1935 to Sept. 1937 Asst. Engr., and Associate Engr., Bureau of Reconstruction, Honan Provincial Govt., China.

LANDER, LUIS WANNONI, Caracas, Venezuela. (Age 27) (Claims RCA 1.7) Jan. 1939–June 1940 Chf. Field Engr., Div. of Malariologia, Ministerio de Sanidad y Asistencia Social, Caracas; previously Field Engr., Div. of Works, Hydraulics and Sanitation, Ministry of Public Works, Caracas.

LEE, MERLIN ELLSWORTH, Morgan City, La. (Age 24) Nov. 1941 to date Associate Inspector of Constr., U.S. Navy, Bureau of Yards and Docks; Student Engr., The Panama Canal.

MULLER, JOHN WILLIAM, Balboa, Canal Zone. (Age 27) Jan. 1941 to date with The Panama Canal, as Office Aide (SP-3 and SP-4) and (since Aug. 1941) Jun. Engr. (P-1).

1941 GRADUATES

THE CITADEL
(B.S.) (AGE)

YOUNG, ROBERT MERIWETHER (23)

RUTGERS UNIV.
(B.S. in C.E.)

JAREMA, ANDREW (26)

WASH. STATE COLL.
(B.S. in Civ. Eng.)

JEPSON, JOHN CLAUS (25)

The Board of Direction will consider the applications in this list not less than thirty days after the date of issue.

Engineering Societies Personnel Service, Inc.

NEW YORK	CHICAGO	DETROIT	SAN FRANCISCO
31 W. 39TH ST.	211 W. WACKER DR.	100 FARNSWORTH AVE.	57 POST ST.

The items listed below have been furnished by the Engineering Societies Personnel Service, Inc., which is under the joint management of the Four Founder Societies. This service is available to members and is operated on a cooperative, non-profit basis. In applying for positions advertised by the Service the applicant agrees, if actually placed in a position through the Service as a result of these advertisements, to pay a placement fee in accordance with the rates as listed by the Service. These rates have been established in order to maintain an efficient, non-profit personnel service and are available upon request. This also applies to registrants whose notices are placed in these columns. All replies should be addressed to the key numbers indicated and mailed to the New York Office.

A weekly bulletin of engineering positions open is available to members of the cooperating societies at a subscription of $3 per quarter or $10 per annum, payable in advance.

MEN AVAILABLE

CONSTRUCTION SUPERINTENDENT; Assoc. M. Am. Soc. C.E.; graduate engineer; accustomed to organizing and directing works of magnitude here and abroad; 16 years with one company. Ordnance, munition, chemical, industrial, hydroplants, dams, tunnels, hydraulic, water work, railroads, highways, sewage disposal, water systems, heavy earthwork. American with following of construction, engineering, and design men. Just finished government defense project for one of largest concerns. C-898.

CIVIL ENGINEER; Jun. Am. Soc. C.E.; 29; married; B.S. in C.E.; 5 years experience in highway location; 3 years varied construction experience, including earthwork, concrete, and some bridge experience. Would like to have employment that offers opportunity to learn heavy foundation and bridge work. Available on two weeks' notice. C-899-568-Chicago.

CONSTRUCTION ENGINEER; Assoc. M. Am. Soc. C.E.; age 37; married; 3 years general construction; 8 years on dams, power plants, levees, and buildings; 7 years charge of erosion control and drainage projects; some experience on construction of portable-type barracks. Desires position with reputable contracting or engineering firm. Now employed but available on reasonable notice. Location immaterial. C-903.

HYDRO-ELECTRIC ENGINEER; M. Am. Soc. C.E.; age 41; married; no dependents; graduate C.E.; 13 years experience in design, supervision, and coordination of design of hydroelectric projects of all types. Available on short notice. Location immaterial. C-902.

CIVIL ENGINEER; Jun. Am. Soc. C.E.; 26; single; B.S.C.E., University of Colorado, 1938; 3 years experience in hydrology; 9 months in structural drafting. Would like opportunity as office engineer or junior executive position in construction field. Especially interested in design and development of airports and air bases. C-901.

ASSISTANT PROFESSOR; Assoc. M. Am. Soc. C.E.; registered engineer; S.M.; 4 years on teaching staff of leading Eastern institution; 8 years experience in structural and hydraulic design; now employed; technical writer; engineering mechanics, statics, and dynamics; strength of materials; determinate and indeterminate structures; elasticity; photoelasticity; structural design, steel, wood, concrete; hydraulics and fluid mechanics; engineering mathematics. C-900.

POSITIONS AVAILABLE

CONSTRUCTION ENGINEERS. Large industrial company desires construction engineers with C.E. or M.E. degree, who have had several years' experience on industrial plant construction, power house construction, and/or equipment installation to work on construction of national defense plants being built for our Government in the South and Middle West. Also need Junior Engineers with construction layout experience. Apply by letter giving full details regarding experience, age, college, year graduated, degree, citizenship, present salary, salary expected, by whom employed, and references. Enclose small photograph. Will keep confidential. Y-9146.

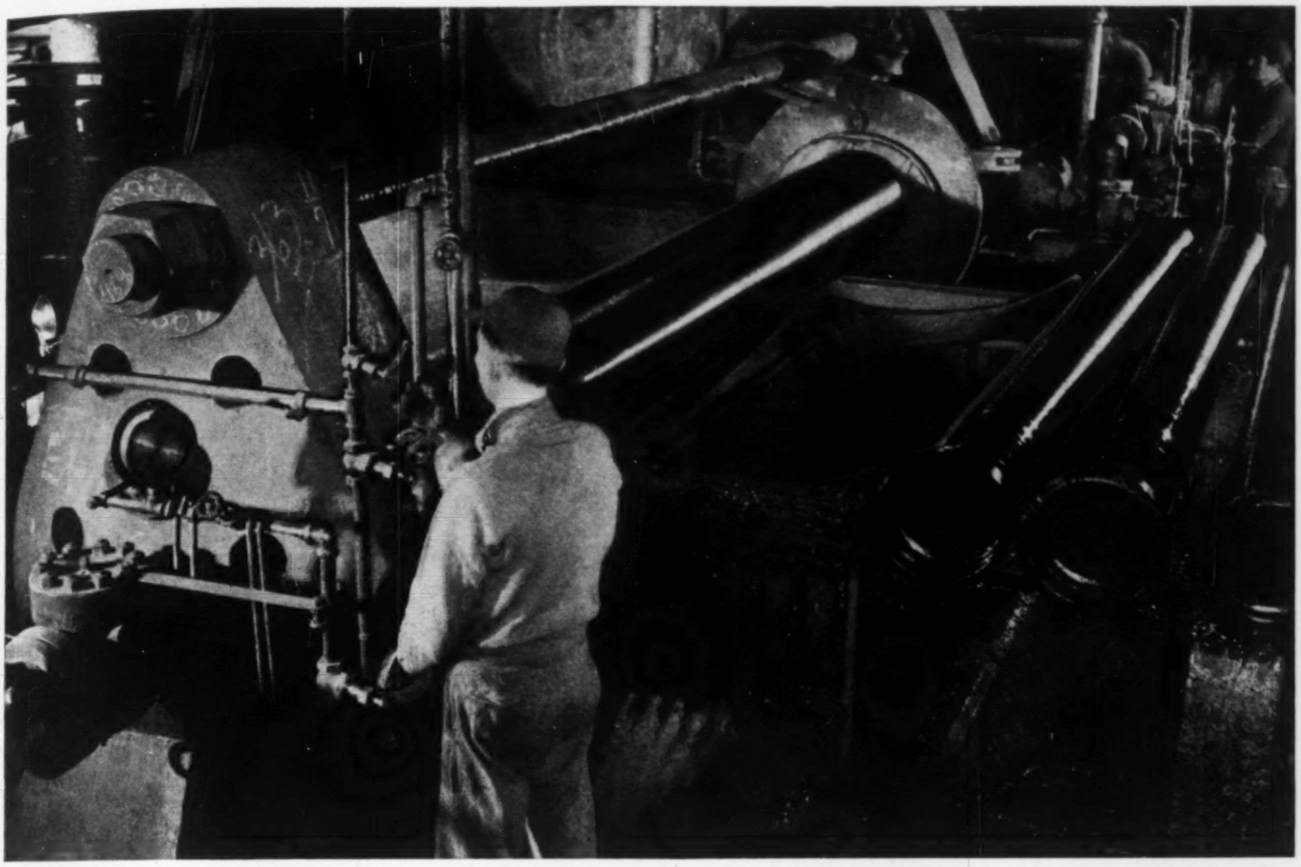
GRADUATE CIVIL ENGINEER, 25–30, with approximately 2 or 3 years' experience in concrete construction, to act as superintendent for a subcontractor. Must be able to take charge and handle men. Salary open. Considerable traveling, expenses paid. Headquarters, New York, N.Y. Y-9622.

STRUCTURAL ENGINEERS who have had experience in structural steel building design of a similar nature to that employed in power plant construction. Salaries, $3,120–$3,900 a year. Location, New England. Y-9628.

STRUCTURAL DRAFTSMEN. Duration, 6 months to a year. Salary, $2,100–$3,000 a year or more. Location, South. Y-9629.

CONSTRUCTION SUPERINTENDENT, 28–38, on asphalt roads, highways, and air fields. Must know costs and take complete charge of job. Salary, $3,000–$3,300 a year. Headquarters, New York, N.Y. Present location, South. Y-9631.

DESIGNERS AND DRAFTSMEN, piping, structural steel, concrete, and electrical, with previous experience in oil refinery or chemical plant desir-



* The "Hydrostatic Proof Test," illustrated above, is an acceptance test for cast iron pipe. Every full length of pipe—whether for water, gas, sewer or industrial service—is subjected to this test before shipment. It is one of the routine tests made by this Company to insure that the quality of its pipe meets or exceeds the requirements of accepted standard specifications for cast iron pipe. *United States Pipe and Foundry Co., General Offices: Burlington, N. J.* Sales Offices in Principal Cities.

*** One of a series of controls in operation at each of our plants, beginning with inspection and analysis of raw materials and ending with tests of the finished product, all subject to the central control of our headquarters staff at Burlington.**

U.S. cast iron PIPE

Centrifugally or Pit Cast for water, gas, sewerage, drainage and industrial services.

able. Salaries: Draftsmen, $3,120 a year; Designers, $3,600 a year, plus overtime. Location, New York, N.Y. Y-9635.

Senior Draftsman, single, for designing, detailing, and drafting plans for residential, commercial, and industrial buildings of timber, masonry, and steel construction. Must be practical and have good working knowledge of building trades, practices, and construction materials. Must also be a neat and rapid draftsman. Salary, $4,800 a year, minus $1,512 for board, room, and laundry. Six weeks' vacation in the United States after 2 years' employment. Will receive bonus payments. Location, foreign. Y-9639.

Construction Superintendent, single, to supervise construction of camps and industrial facilities such as houses, water lines, sewer lines, roads, etc., and also warehouses, machine shops, and other structural buildings. Must be able to plan work and get it executed without too much supervision. Should have had experience in building foundations for heavy machinery. Salary, $5,400 a year, minus $1,512 for board, room, and laundry. Six weeks' vacation in the United States after 2 years' employment. Will receive bonus payments. Location, foreign. Y-9640.

Civil Engineer. Must be a native-born United States citizen and have a professional engineer's license. Must also have had several years' experience in the design and construction of heavy structural projects, and be capable of supervision in field as well as direction of design. One-year contract on salary and bonus arrangement. Single status. Location, foreign. Y-9649.

Topographical Draftsman who is experienced in making maps from notes. As this work is for artistic map making, an exceptionally good draftsman is required. An engineer who has had some free-hand sketching as well as topographical drafting is desired. Salary, $2,600 a year. Location, New York, N.Y. Y-9650.

Construction and Steel Designer with general and industrial experience for industrial plant. Permanent. Location, New York, N.Y. Y-9653.

Designers and Draftsmen for sewage, water supply, and drainage project. Must have had some experience in this field of work. Defense project. Must be United States citizen. Temporary. Salary, $2,600–$4,420 a year. Location, upper New York State. Y-9655.

Inspectors, construction, on buildings, sewers, railroads, water supply. Position will probably last 18 months. Salary, $2,400–$3,000 a year. Location, south of Richmond, Va. Y-9658.

Instructor who can handle work in surveying sanitary field, and some work in structures. Prefer applicant who has had some graduate work and some experience in teaching or practice or both. Training in hydraulic field would be acceptable. Salary open. Location, New England. Y-9665.

Chief Engineer who has had experience on miscellaneous buildings, roads, sewers, etc., for large camp. Salary, about $6,000 a year. Headquarters, Pennsylvania. Y-9667.

Designers and Draftsmen who have had experience on water, sewer, and road work, for a large camp. Headquarters, Pennsylvania. Y-9668.

Topographical Draftsmen who have had experience on the board. Must be United States citizens. Salary, $2,000–$2,600 a year. Y-9684 (*a*).

Estimator familiar with reinforced concrete buildings and general building construction in Metropolitan Area. Salary, $2,600–$3,380 a year. Y-9689.

Junior Engineers, civil, electrical, architectural, mechanical, and automotive, for War Department. Must be a graduate of a recognized college. Duties are: To have charge of conducting proof tests of ammunition, artillery material, automotive material, and accessories to interpret directives for tests; to plan work required; to design special laboratory apparatus for special tests and research studies; to submit concise reports covering behavior of material; and to make recommendations for acceptance or changes in design. Salary, $2,000 a year. Location, South. Y-9700.

Structural Designer to head up design of docks, timber, concrete. Also assistant structural designers. Salaries, $6,000–$7,800 a year. Location, Africa. Y-9704(*c*).

Civil Engineer to head up all engineering surveying on road work, railroad layout, etc., for large construction project. Salary, $7,800 a year. Location, Africa. Y-9705.

Designers who have had considerable experience on drainage, water supply, highways, etc., for construction project in New York Metropolitan Area. Salary, to $5,200 a year. Y-9708.

Structural Engineer, 30–50, graduate civil engineer with at least 4 or 5 years' experience in the design of fabricated steel buildings and reinforced concrete structures. Should also know strength of materials and, if possible, be a registered professional engineer or have sufficient background to obtain license. Salary, $3,000–$3,600 a year. Permanent. Location, Middle West. Y-9711.

Chief Civilian Engineer experienced in large structural steel, brick, concrete, and timber buildings. Six months duration, probably more. Salary, $5,600 a year. Location, South. Y-9717 (*a*).

Designers who are qualified through experience to design the drainage, sewage, and water supply plans for a large housing project. Salary open. Location, South. Y-9718.

Structural Engineer, graduate, to act as assistant to chief structural engineer. Must be experienced in design of steel and concrete structures for steam power plants and industrial plants. Must also be a good draftsman and able to make neat, accurate drawings when required. Must have a good personality and be used to meeting clients. Must also be a United States citizen, preferably American born. Forty-hour week. Salary, about $4,160 a year. Location, New England. Y-9729.

RECENT BOOKS

New books of interest to Civil Engineers donated by the publishers to the Engineering Societies Library, or to the Society's Reading Room will be found listed here. The notes regarding the books are taken from the books themselves, and this Society is not responsible for them.

Acoustics of Buildings Including Acoustics of Auditoriums and Soundproofing of Rooms, 3 ed. By F. R. Watson. John Wiley & Sons, New York; Chapman & Hall, London, 1941. 171 pp., illus., diagrs., charts, tables, 9½ × 6 in., cloth, $3.

This well-known text has been rewritten to take account of developments during the last ten years, and again offers a convenient account of current opinion and practice. The conditions for perfect acoustics, the behavior of sound waves in rooms, the design of auditoriums, and methods of sound insulation are discussed in detail.

Boulder Canyon Project, Final Reports. Part IV—Design and Construction. Bulletin 1—General Features, 301 pp.; Bulletin 2—Boulder Dam, 253 pp. U. S. Bureau of Reclamation, Denver, Colo., 1941, illus., diagrs., charts, tables, maps, 9½ × 6 in., cloth, $2 each; paper, $1.50 each.

Continuing the series on the Boulder Canyon project, the present bulletins deal with design and construction work. Bulletin 1 presents general descriptive information about the preliminary construction, the power plant and other appurtenances to the dam, Lake Mead, and the All-American Canal system. Bulletin 2 presents detailed data and information regarding the design and construction of the dam itself.

Bridges and Their Builders. By D. B. Steinman and S. R. Watson. G. P. Putnam's Sons, New York, 1941. 379 pp., illus., diagrs., woodcuts, 9 × 6 in., cloth, $3.75.

The development of the bridge through the ages is told in narrative style. The bridges are considered not only as pieces of engineering construction but also as expressions of the periods in which they were erected, and the characters and achievements of the builders are set forth against the background of the conditions under which they worked. With respect to the more important bridges a considerable amount of technical and factual data has been included.

Career in Engineering, Requirements, Opportunities. By L. O. Stewart. Iowa State College Press, Ames, Iowa, 1941. 87 pp., illus., tables, 9 × 6 in., paper, (75 cents single copies; 50 cents for five or more).

The first objective of this booklet is to furnish information about engineering to young men who are considering a career in that field. To do this the author presents answers for the three standard questions: What does an engineer do; what are the necessary qualifications; and what are the prospects for the future in the field.

Civil Defence, 3 ed. revised and enlarged. By C. W. Glover. Chemical Publishing Co., Brooklyn (N.Y.), 1941. 794 pp., illus., diagrs., charts, tables, 9 × 5½ in., cloth, $16.50.

This practical manual presents, with working drawings, the methods required for adequate protection against aerial attack. The comprehensive nature of the work is indicated by the inclusion of material on bombs and their effects, war gases, camouflage, civilian instruction, training of A.R.P. personnel, and cost estimates (British figures), in addition to the large amount of space devoted to the construction of all types of protective buildings and shelters. There is a bibliography.

Handbook for Civilian Defense. By H. Mayer-Daxlanden. Civilian Advisory Service, New York (41 Park Avenue), 1941. 88 pp., illus., diagrs., 9 × 6 in., paper, $1.

This elementary handbook for civilian defense workers has two objectives. First, it deals in a simple, concise manner with all phases of civilian defense training and organization for war conditions; and second, it shows the value of such training for various peace-time emergencies and natural disasters.

Housing for Health, Papers Presented Under the Auspices of the Committee on the Hygiene of Housing of the American Public Health Association. Science Press Printing Co., Lancaster (Pa.), 1941. 221 pp., diagrs., charts, tables, 9 × 6 in., paper, $1.

A variety of subjects is considered in this collection of papers presented under the auspices of the American Public Health Association. Housing codes and surveys, slum-clearance, health and recreational facilities in housing projects, noise control, house construction, and social implications are among the topics dealt with by various authorities in the field.

Municipal Public Works Administration. Published by the Institute for Training in Municipal Administration, Chicago (1313 East 60th Street), 1941. 379 pp., illus., tables, diagrs., charts, 11 × 8 in., mimeographed, cardboard.

The principal changes made in this revised edition include an entirely new introductory chapter; a new chapter on planning and programming of public works; and new chapters on public relations and personnel management. All the other chapters have been considerably changed in form and content, and the result is a more concise analysis of the problems of administering a municipal public works program.

Outlines of Geology. Outlines of Physical Geology, by C. R. Longwell, A. Knopf, and R. F. Flint, 381 pp.; Outlines of Historical Geology, 2 ed., by C. Schuchert and C. O. Dunbar, 291 pp. John Wiley & Sons, New York; Chapman & Hall, London, 1941. Illus., diagrs., charts, tables, maps, 9 × 6 in., cloth, $4.

Combining two well-known elementary texts on physical and historical geology, the present volume was developed to furnish a brief treatise covering the salient features of the entire subject. In the first part, the principles of physical geography are explained as a key to the reading of geologic history, and the relation of these principles to practical human affairs is emphasized. The historical geology section presents a concise, general survey of the past history of the earth.

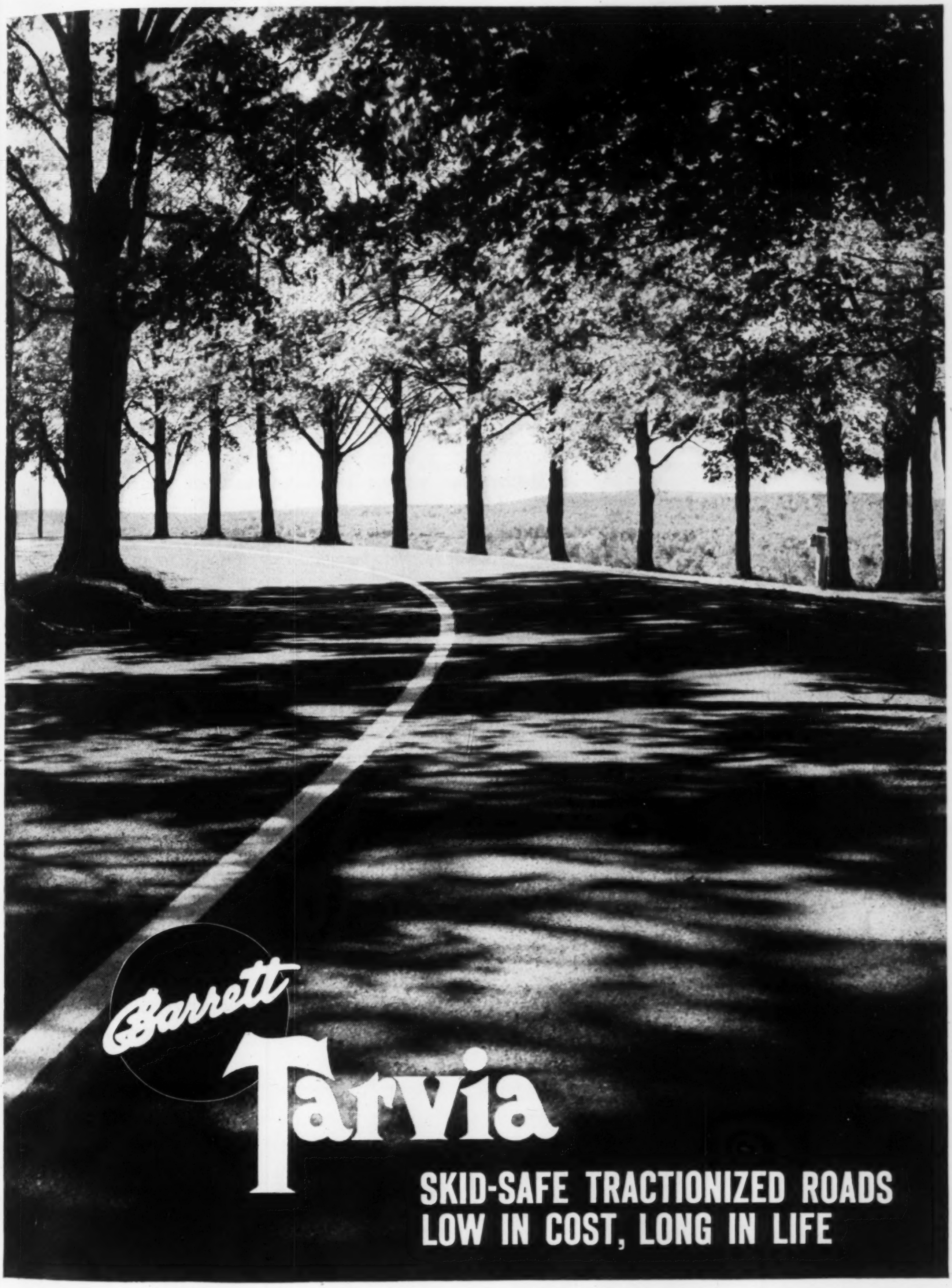
Traffic Accidents and Congestion. By M. Halsey. John Wiley & Sons, New York; Chapman & Hall, London, 1941. 408 pp., illus., diagrs., charts, tables, 10 × 7 in., cloth, $4.

This volume sets forth the principles that underlie the scientific methods currently being developed to reduce traffic accidents and congestion. It is an engineering approach to these problems as they affect the movement of persons and merchandise. Application of the principles here outlined presents a basis for evaluating all elements of the traffic problem. There is a large bibliography.

Weirs, a Bibliography of Books, Periodicals, and Society Publications appearing from 1882 through 1940. Compiled by Claude C. Lee, 1315 First North St., Vicksburg (Miss.), October 1941. 107 pp., typewritten, $5.

Welding and Its Application. By B. E. Rossi. McGraw-Hill Book Co., New York and London, 1941. 343 pp., illus., diagrs., charts, tables, 9½ × 6 in., cloth, $2.50.

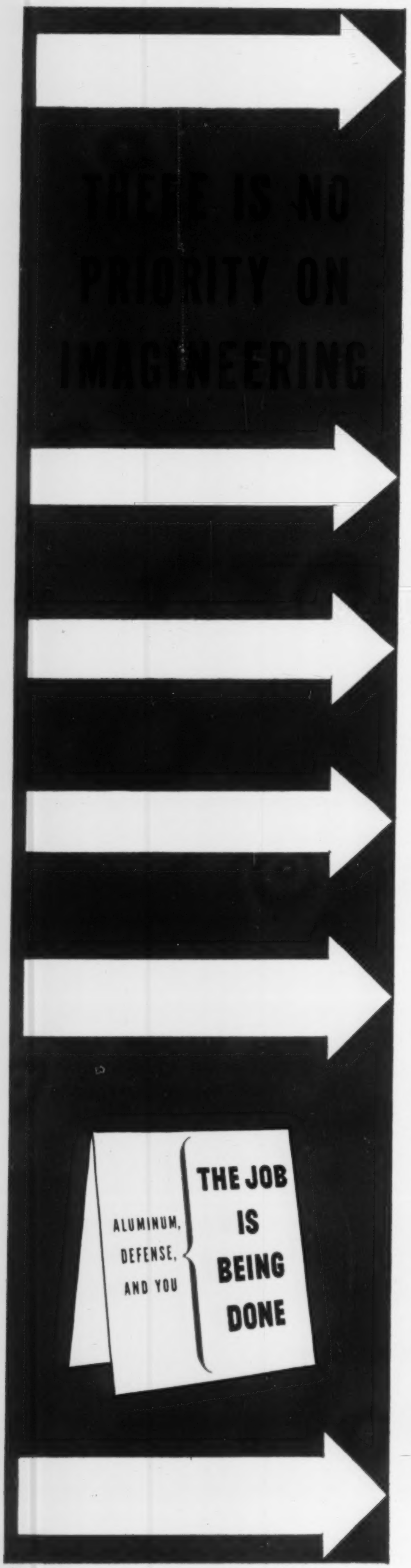
Welding and cutting processes, with the emphasis on electric-arc welding, are comprehensively covered, with their related phenomena, their techniques, and their general application in industry. The intention is to present fundamental facts for the beginner, give the experienced operator a wider understanding of the welding process, and provide a source of reference for draftsmen, designers, engineers, and any others interested in the subject.


Barrett
Tarvia
SKID-SAFE TRACTIONIZED ROADS
LOW IN COST, LONG IN LIFE

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York

Chicago Birmingham St. Louis Detroit Philadelphia Boston Providence Lebanon, Pa. Rochester Baltimore Minneapolis Cleveland Columbus Toledo Youngstown Syracuse Hartford Buffalo Cincinnati Bethlehem Portland, Me. Norwood, N. Y.
In Canada: THE BARRETT COMPANY, LTD. Montreal Toronto Winnipeg Vancouver

. . . ONE OF AMERICA'S GREAT BASIC BUSINESSES



EVERY INDUSTRY, every responsible man in industry, has the present duty of answering two questions.

FIRST ONE IS: Are we, am I personally, doing everything within my power for the war? Our answer here at Alcoa is a plain, unqualified, yes.

NEXT QUESTION IS: What are we doing about the day when we will all need business, which is the polite way of saying, when millions of jobs will be needed for the boys who come back, and for the boys who stayed back to make the weapons.

IMAGINEERING, you know, is the word we have coined to define what we business people have all got to do about the future; about the products we are going to make and the services we are going to be able to offer when this war is over. Imagineering is imagination plus engineering.

HOW DO YOU DO IT? One way would be to figure out, now, how to take advantage of all the aluminum that is going to be available.

QUICKEST WAY TO GET AT IT is to take one of your products or a piece of equipment that "just couldn't" be made of aluminum, and ask yourself, Why not?

MEANING, OF COURSE, why not light; why not stronger for the same weight; why not resistant to corrosion, and so on, ad infinitum. The first man in any line of business who calls tradition a liar, and things-as-they-are a millstone, is the man who is going places; the man who is going to make peacetime pay rolls.

THAT'S IMAGINEERING AT WORK. We've got some ideas here at Alcoa. We're trying to pass them out. We are looking for men who have made themselves receptive by doing some solid Imagineering on their own hook, in their own fields.

Aluminum Company of America, 2127 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA ALUMINUM

CURRENT PERIODICAL LITERATURE

Abstracts of Articles on Civil Engineering Subjects from Publications (Except Those of the American Society of Civil Engineers) in this Country and Foreign Lands

Selected items for the current Civil Engineering Group of the Engineering Index Service, 29 West 39th Street, New York, N.Y. Every article indexed is on file in The Engineering Societies Library, one of the leading technical libraries of the world. Some 2,000 technical publications from 40 countries in 20 languages are received by the Library and are read, abstracted, and indexed by trained engineers. With the information given in the items which follow, you may obtain the article from your own file, from your local library, or direct from the publisher. Photoprints will be supplied by this library at the cost of reproduction, 25 cents per page to members of the Founder Societies (30 cents to all others), plus postage, or technical translations of the complete text may be obtained at cost.

CONCRETE

Penstocks, Supports. Temporary Support for Penstock to Be Embedded in Concrete Dam. *Eng. News-Rec.*, vol. 127, no. 17, Oct. 23, 1941, p. 556. Dam for developing additional power on Lois River in British Columbia had to be built around 10-ft penstock in which it was desirable to minimize any service interruption; this was accomplished at minimum expense by use of concrete columns or piers that were later embedded in concrete of dam itself.

Port Structures. Use of Reinforced Concrete in Marine Structures, N. L. Vickerman. *New Zealand Instn. Engrs.—Bul. & Proc.*, vol. 27, no. 2, July 1941, pp. 163–174. Advantages of reinforced concrete for heavier and more permanent marine structures pointed out; discussion of designs, using reinforced concrete for deck construction, wharves, piles, and foundation caissons; comments on sea-water corrosion and summary of repair records at Auckland.

Ready Mixed. Crushed Stone for Ready Mix. *Rock Products*, vol. 44, no. 10, Oct. 1941, pp. 76 and 78. Notes on plant and practice of M. L. Kernan Quarry, producer of crushed trap rock of South Orange, N.J.; new outlets being desired, Kernan Concrete Company was organized as subsidiary to operate new business; plant is built to handle 1,000 cu yd concrete in 9 hours.

Ready Mixed. Housing Projects Pull Business. *Rock Products*, vol. 44, no. 10, Oct. 1941, p. 73. Brief description of plant and practice of Linthicum's Certified Concrete Company at High Point, N.C., supplying 12,000 cu yd of concrete to two slum-clearing housing projects.

Ready Mixed, Connecticut. Uniformity Controls. *Rock Products*, vol. 44, no. 11, Nov. 1941, pp. 63 and 69–70. Notes on plant and fleet equipment of company long established in aggregates and contracting businesses in New Haven, Conn.; after starting ready-mixed concrete business in 1930, complete change in plant was made in 1933; mixing and delivery practice.

Reinforcement. New Method of Reinforcing Concrete Masonry Walls, H. L. Spaight. *Concrete*, vol. 49, no. 7, July 1941, p. 16. Specially designed and fabricated steel reinforcement overcomes any tendency toward cracking, in wall of concrete masonry. Before Nat. Concrete Masonry Assn.

Tanks. Concrete Tanks for Diesel Fuel Storage. *Oil Engine*, vol. 9, nos. 100 and 101, Aug. 1941, p. 92, and Sept., p. 118. Attention directed principally to tanks ranging in capacity from 2 to 25 tons; converting existing structures; respective advantages of various types of tank; centrifugally cast tanks; interior dressings; progress being made.

Walls. Restoring and Waterproofing Old Walls of Concrete or Masonry. *Concrete*, vol. 49, nos. 7 and 9, July 1941, pp. 14–15 and 29, and Sept., pp. 18 and 29. Description of method of waterproofing and restoration or protection of old exterior walls of brick masonry through application of well-anchored protective coating of metal lath and cement and sand mortar or stucco; use of rawl drives and rawl plugs for anchoring metal lath to masonry and concrete, described and illustrated.

DAMS

Earth, New York. Building Merriman Dam, J. M. Ribble. *Compressed Air Mag.*, vol. 46, no. 9, Sept. 1941, pp. 6525–6532. Features of work on dam being built across Rondout Creek on southerly slopes of Catskill Mountains to create reservoir that will impound runoff of watershed with area of about 95 sq miles and provide city of New York with added supply of about 100,000,000 gal per day.

Hydraulic Gates. Howell-Bunger Hydraulic Discharge Valve. *Engineering*, vol. 152, no. 3948, Sept. 12, 1941, pp. 216–217. Illustrated description of balanced discharge valve made by S. Morgan Smith Co., York, Pa.; standard valves are built for head of 250 ft, but large valves at Mud Mountain Dam operate under head of 340 ft; valve consists of cylindrical casing, or body, on outside of which there is sliding sleeve, or gate.

Reservoirs, Failure. Geologic Interpretation of Failure of Cedar Reservoir, Washington, J. H. Mackin. *Univ. Washington—Engr. Experiment Station—Bul. No. 107*, Mar. 1941, 30 pp. Geological study explaining reasons for excessive leakage from Cedar-Lake Reservoir formed by concrete-gravity dam about 217 ft high, built in 1914 for expected power supply for city of Seattle, Wash.

FLOOD CONTROL

Arkansas-Missouri. Forearming for Floods. *Explosives Engr.*, vol. 19, no. 8, Aug. 1941, pp. 236–244. Dam and reservoir projects under direction of U. S. Army Engineers will assist control of floods on Arkansas and Lower Mississippi rivers; Blue Mountain Dam across Petit Jean River in central western Arkansas; Nimrod Dam across Fourche La Fave River in Perry County, Arkansas; Norfork Dam across North Fork River in Baxter County, Arkansas; Clearwater Dam across Black River in Reynolds and Wayne Counties, in southwestern Missouri.

Oklahoma. Fort Supply Dam Project, H. Wilson. *Compressed Air Mag.*, vol. 46, no. 8, Aug. 1941, pp. 6518–6519. Notes on project, chief purpose of which is flood regulation of North Canadian River; dam is located on Wolf Creek, near Fort Supply, Oklahoma, about 3 miles from junction with North Canadian River; earth-fill structure 2 1/4 miles long, maximum height 81 1/2 ft; project includes drainage system to give structure, outlet works, and concrete spillway increased stability; three separate contracts; reservoir will impound 102,000 acre-feet of water and will cover about 6,500 acres.

Railroads. Santa Fe Strengthens Lines to Fight Flood Waters. *Ry. Age*, vol. 111, nos. 15 and 20, Oct. 11, 1941, pp. 569–571 and 585–586, and Nov. 15, pp. 778–781. Changes in alinement and special protection in riprap, rail fences, steel jetties, concrete blankets, rail-crib dikes, and other forms are some of precautions being taken by Atchison, Topeka and Santa Fe Railroad to provide greater security against floods, as described in article.

Rain Gages. Recording Rainfall Gage Designed for Remote Mountain Station. W. J. Wood. *Eng. News-Rec.*, vol. 127, no. 15, Oct. 9, 1941, pp. 503–504. Description of special type recorder used in connection with operation of Big Tujunga Dam of Los Angeles County Flood Control District; impulses actuated by tilting bucket unit are transmitted 12 miles to integration type instrument designed to insure record of high intensity precipitation.

FOUNDATIONS

Caissons, Floating. Deep Caisson for Panama Canal Built on Ohio River, M. M. Lachowski. *Eng. News-Rec.*, vol. 127, no. 15, Oct. 9, 1941, pp. 486–487. Floating caisson, having draft of 32 ft, intended for closing lock entrances at Panama Canal to allow repair work, was built at Neville Island yard of Dravo Corporation, Pittsburgh, Pa.; caisson was floated on its side down shallow waterway in Ohio and Mississippi and then righted at New Orleans for towing to Panama.

Cofferdams. Zur Bemessung des Doppelten Spundwandbauwerkes, I. A. Rimstad. *Ingeniorvidenskabelige Skrifter*, no. 4, 1940, 117 pp. Double sheet-pile structure with internal filling (cofferdam); theoretical mathematical study of internal stability, influence of external load, and model law of double sheet-pile construction; results of model tests. (In German with Danish abstract.)

Construction. Nearby Structures Create Unusual Foundation Problems for New Building. *Eng. News-Rec.*, vol. 127, no. 15, Oct. 9, 1941, pp. 488–490. Methods of protecting surrounding situations during construction of foundation for building of E. R. Squibb & Sons, Brooklyn; use of stepped-back cellar with line wall loads carried on piles and unusual retaining walls solved problem; means of protecting adjoining smokestack 175 ft high.

Piles, Concrete. Current Methods of Driving Concrete Piles at Lake Maracaibo, W. A. Sawdon. *Petroleum Engr.*, vol. 13, no. 1, Oct. 1941, pp. 165–166 and 168. On water location of Lago Petroleum Corporation, solid concrete piles have been used successfully in depths as great as 60 ft, piles being as long as 133 ft; to overcome conditions found in deep water, tubular or caisson type of pile was developed; hollow caisson-type piles 60 in. in diameter, driven by 200-ton deadweight, have safety factor of 2.

Soils, Mechanics. Clay and Soil Mechanics, R. R. Minikin. *Engineering*, vol. 152, nos. 3950 and 3951, Sept. 26, 1941, pp. 241–243, and Oct. 3, pp. 261–263. In spite of present inability of engineers to postulate in simple form laws that govern behavior of clays, there are means for determining behavior of particular clays in natural state, where conditions are known; survey of soil mechanics mechanism; endeavor has been to give practical shape to application of this new science; there remains, however, wide field for prosecution of research.

HYDRAULIC ENGINEERING

Hydraulic Laboratories, Vicksburg, Miss. U.S. Waterways Experiment Station, M. C. Tyler. *World Ports*, vol. 4, no. 1, Oct. 1941, pp. 26–29 and 49. Its service for harbor improvement problems; origin and organization; port and harbor projects studied; construction of models; examples of fixed bed models; example of movable bed studies.

HYDROLOGY AND METEOROLOGY

Core Sampling. Study of Lake Deposits, B. M. Jenkin, C. H. Mortimer, and W. Pennington. *Nature* (London), vol. 147, no. 3730, Apr. 26, 1941, pp. 496–500. Core sampler in modified form has been successfully operated in Lake Windermere, England, and cores up to 6.5 m in length obtained under 65 m of water; it is operated from pontoon held in position by four anchors and consists of core cutter, extension tube, and turning gear; sampling operation; comparison of cores with echo sounding records; organic remains in cores. Bibliography.

Magnesium. Magnesium from Sea, S. D. Kirkpatrick. *Chem. & Met. Eng.*, vol. 48, no. 11, Nov. 1941, pp. 76–84 and 130–133. Description of operations carried out at plant of Dow Chemical Co., Freeport, Tex., in recovery of metallic magnesium from raw sea water; various steps taken in procedure are given in flowsheet on p. 130.

Natural Gas Pipe Lines, Operation. Weather Forecasting—Its Relation to Gas Dispatching, B. M. Laulhere. *Am. Gas Assn.—Proc., Mtg. May 5–7, 1941.* (Natural Gas Assn.), pp. 39–42. Chief trends of meteorology are application of sound physical principles to forecasting, and organization of more intensified and specialized types of weather service, designed to meet specific needs for individual interests and activities; effect of temperature, of wind, of fog and clouds, and of snow on operation of natural gas lines; notes on practices of Southern California Gas Co.

Reservoirs, Agricultural Effect. Effect Upon Ground-Water Levels of Proposed Surface-Water Storage in Flathead Lake, Mont., R. C. Cady. *U. S. Geol. Survey—Water Supply Paper No. 849-B*, 1941, pp. 59–80, supp. plates. Preliminary ground-water study designed to provide basis for estimating damage to crops to be expected from raising of level of Lockhead Lake, which is expected to affect agricultural area of 25 sq miles; natural ground-water conditions; trends of water levels; effect of temperature; relations of water level in wells to rise and fall of river and lake; adjustments of ground-water levels to lake regulations.

Runoff. Stormwater Drainage in Flat Country, E. D. Grubb. *Surveyor*, vol. 99, no. 2576, June 6, 1941, pp. 359–360. Discussion of problems created in flat districts due to building development or airport construction; data given on rainfall and runoff with view to construction of plant for accommodation of drainage.

INLAND WATERWAYS

Rivers, Improvement. Dredging Lower Missouri River. *Compressed Air Mag.*, vol. 46. no. 8, Aug. 1941, pp. 6509–6513. Description of work forming part of program of stabilization of Missouri River; plans involve relocating and deepening channel at eight different points within stretch of about 200 miles in low reaches of river, and building rock dikes with material excavated; operations were begun Mar. 16, 1940, and same general procedure was followed on each job; survey; drilling; blasting; dredging; survey for high spots.

IRRIGATION

Central Valley Project, California. Central Valley Project, *Rock Products*, vol. 44, no. 10, Oct. 1941, pp. 33, 35–38, 41–48, 50, 53–54, 56, 58, 60–62, 64, and 66. Project involves conservation and regulation of waters of San Joaquin and Sacramento rivers for purposes of flood protection, electric power development, irrigation; control of salt encroachment at river's outlet, industrial and domestic water supply sources, and improvement of inland navigation; general outline; cement and aggregates specifications; Permanente cement plant; Friant Dam, Shasta Dam, and Fair Oaks aggregates plants; Calaveras supplies 50% of cement for Friant Dam.

LAND RECLAMATION AND DRAINAGE

Brazil. Servicos de drenagem e estabilisacao de bases de aterros—Relatorio de 1940. A. C. Ribeiro. Sao Paulo, Brazil. *Departamento de Estradas de Rodagem—Boletim*, vol. 7, no. 23, Apr. 1941, pp. 196–206. Services of drainage and stabilization of subsoils, report for 1940: vibration of soils; vertical drainage; retention barriers in subsoils; drainage conduits of perforated pipes and of broken stone; open conduits; consolidation of slopes; straightening and clearing Couros Creek of detritus which obstructs flow of water.

MATERIALS TESTING

Cement. How Storage Affects Three Types of Cement, K. Watanabe. *Concrete*, vol. 49, no. 9, Sept. 1941 (Cement Mill Sec.), pp. 232 and 242. Report of effects of warehouse storage on one brand of standard portland cement, on one brand of rapid-hardening cement, and on high silica blended cement, reported. Before Assn. Japanese Portland Cement Engrs.

Cement. Insoluble Residue in Cement and Its Effect on Strength of Concrete, A. J. Blank. *Pit & Quarry*, vol. 34, no. 5, Nov. 1941, pp. 66–67. Even passing of 28-day strength requirement does not necessarily give true indication of behavior of that cement in concrete over period of years; tests were made upon various brands of portland cements, in connection with tests already started upon special cements; results indicate that two special types produced in Mexico show progressive increase in strength over period of years.

Cement. Measuring Fineness of Portland Cement. *Concrete*, vol. 49, no. 9, Sept. 1941 (Cement Mill Sec.), pp. 233–235. Method of test covers Wagner turbidimeter apparatus and procedure for determining fineness of portland cement as represented by specific surface expressed as total surface area in square centimeters per gram of cement. Before Am. Soc. Testing Matls.

Concrete. How Wheel-Load Pressures Spread Through Concrete Pavement Slabs, M. G. Spangler and H. O. Ustrud. *Concrete*, vol. 49, no. 8, Aug. 1941, pp. 33–34. Notes on progress of investigation conducted at Iowa State College, Ames, Iowa, by Iowa Engineering Experiment Station; report is based on laboratory experiments, but set-up for these experiments was on scale large enough to approximate actual service conditions on highways.

Concrete. Medicine Lake Test Specimens Disclose Factors in Durability. *Concrete*, vol. 49, no. 9, Sept. 1941, pp. 4–5. Results of 5-year storage of thousands of test specimens of concrete stored in Medicine Lake, South Dakota, for purpose of testing resistance of various cements to waters impregnated with sulfates.

Road Materials, Asphalt. Natural Sandstone Rock Asphalt, O. R. Tyler, W. H. Goetz, and C. Slesser. *Purdue Univ.—Eng. Bul.—Eng. Experiment Station—Research Series No. 78*, vol. 25, no. 1, Jan. 1941, 71 pp. Results of exploratory investigations performed by Joint Highway Research Project on general physical characteristics of rock asphalt and performance of this material under different conditions of curing; discussion of deposits in Kentucky; methods of testing; rock asphalt service performance; suggested future investigations. Bibliography.

Road Materials, Bituminous. Beitrag zur Wasserlagerungsprobe, J. Miegl. *Bitumen*, vol. 11, no. 1, Jan. 1941, pp. 3–4. Contribution to problem of adhesion of bituminous binders to stone under effect of water; discussion of practical aspects of problem based on author's experience; influence of various factors; conclusions.

Roads and Streets, Concrete. How Wheel Load Pressures Spread Through Concrete Pavement Slabs, M. G. Spangler and H. O. Ustrud. *Concrete*, vol. 49, no. 8, Aug. 1941, pp. 33–34. Notes on progress of investigation conducted at Iowa State College, Ames, Iowa, by Iowa Engineering Experiment Station; report is based on laboratory experiments, but set-up for these experiments was on scale large enough to approximate actual service conditions on highways.

Road Materials. Zur Frage der Fehlergrenzen bel der Untersuchung von Deckenstuecken, F. Macht. *Bitumen*, vol. 11, no. 1, Jan. 1941, pp. 4–8. Contribution to problem of limits of error in analysis of road material samples; definition of limits of error; results of comparative analysis of 8 samples of asphaltic concrete pavements.

MUNICIPAL ENGINEERING

United States. Municipal Works in United States, E. J. Cleary. *Surveyor*, vol. 99, no. 2568, Apr. 11, 1941, p. 257. Appraisal of performance and forecast of developments in municipal engineering, public works financing, water service, and sewage and refuse disposal.

PORTS AND MARITIME STRUCTURES

Designing for Economic Operation. Harbor Structures Designed to Meet Economic Requirements, R. H. Mann. *World Ports*, vol. 4, no. 1, Oct. 1941, pp. 36–38 and 62–63. Purpose of article is to discuss some of problems entering into determination of type of construction which should afford maximum over-all economy of operation; improved practices in wood preservation; obsolescence problem; new deck design.

Milwaukee, Wis. Port of Milwaukee. *World Ports*, vol. 4, no. 1, Oct. 1941, pp. 42–47. Physical description of harbor; history of port; Port Authority; municipal port facilities; commerce of port; economic effect of development.

Piers, Fire Prevention. Today's Fire Hazards on Piers, G. W. Booth. *World Ports*, vol. 4, no. 1, Oct. 1941, pp. 32–33 and 49. Review of existing conditions; methods of overcoming fire hazards on piers and wharves.

Planning and Operation. Planning and Directing Use of Ports, C. L. Olson. *World Ports*, vol. 4, no. 1, Oct. 1941, pp. 24–25. Suggested plans for promotion of efficiency of existing ports for national defense cargoes.

ROADS AND STREETS

Accident Prevention, Barriers. Protecting Motorists at Grade Crossings and Drawbridges. *Compressed Air Mag.*, vol. 46, no. 9, Sept. 1941, pp. 6541–6542. Brief illustrated description of device known as Evans Electro-Pneumatic Auto-Stop, for use at highway crossings of railroad tracks and drawbridges.

Alabama. Rejuvenating Alabama Road. *Eng. News-Rec.*, vol. 127, no. 17, Oct. 23, 1941, pp. 570–572. Alabama is widening and resurfacing deteriorated pavements, using state equipment and state or WPA labor on experimental and pilot sections; when method is perfected competitive bids will be asked on similar construction; present work is light penetration cover, 2-in. leveling layer of plant mix, and two course wearing surface.

Asphaltic Concrete. Versuche zur Verhinderung der Rissbildung von Asphaltbeton auf Betonunterbau, Haufe. *Bitumen*, vol. 11, no. 1, Jan. 1941, pp. 8–10. Prevention of cracking in asphaltic concrete surface on concrete foundation; design of joints; based on results of experiments; recommendations on bituminous surface material, foundation, and joints.

Bituminous. Bituminous Surface Treatment, T. E. Shelburne. *Purdue Univ. Eng. Bul.—Eng. Experiment Station—Research Series, No. 82*, vol. 25, no. 4, July 1941, 183 pp. Discussion of present surface-treatment practice in light of current research; review is given of development of this type of work in Indiana as well as of specifications and tests that aim at satisfactory performance; extensive survey results by project are given and numerous references made to other related investigations.

Concrete, Asphaltic. Supplies 250,000 Tons of Asphaltic Concrete for Naval Air Base Over Nine-Month Period. *Pit & Quarry*, vol. 34, no. 5, Nov. 1941, pp. 63–65. Features of job at Quonset Point, Rhode Island, involving construction of 735,000 sq yd of airport runways and 190,725 sq yd of roadways; work required 267,349 tons of bituminous mixture; this was produced by new Warren mobile type 900 asphalt plant rated at 100 tons per hour; best day's production was 3,000 tons in 20 hours; procedure in handling, storing, and mixing of ingredients.

Crushed Stone Plants, Portable. Portable Plants Furnish Materials for Indiantown Gap Cantonment. *Pit & Quarry*, vol. 34, no. 4, Oct. 1941, pp. 48–49. Notes on work near Harrisburg, Pa., conducted as WPA project; reservation of 2,600 acres was formerly National Guard camp, but now has facilities for housing and training 22,500 men; crushed stone is used for concrete foundations and for roads.

Drainage. Requirements for Artificial Drainage at Highway Grade Separations, A. Benesch and R. L. Whannel. *Eng. News-Rec.*, vol. 127, no. 15, Oct. 9, 1941, pp. 499–501. Outline of basic principles of design that insure efficient operation, low maintenance, and low annual cost for drainage structures at highway underpasses; illustration and description of pumping plant made necessary by lack of natural drainage.

Highway Lighting. What Price Highway Lighting? E. F. Anderson. *Elec. Light & Power*, vol. 19, no. 7, July 1941, pp. 62–65. Analysis of costs of lighting 48-mile stretch of heavy density traffic artery U.S. 99-E extending from Portland to Salem, Ore., shows annual operating cost of $72,500; accident toll for one year on this highway included 17 after-dark fatalities with 261 night accidents.

Highway Lighting, Canada. World's Largest Stretch of Lighted Highway, R. E. Jones. *Elec. World*, vol. 116, no. 8, Aug. 23, 1941, pp. 48–49. Illustrated description of lighting facilities of Queen Elizabeth Way in Ontario, extending from Toronto to Niagara Falls; buried cable system is multiple with full photronic control of lighting.

Maintenance and Repair. Reinforcing and Widening Existing Highways, D. C. Greer. *Thirteenth Nat. Asphalt Conference—Proc., Mtg. Dec. 9–13, 1940*, pp. 42–44. Methods used in widening and repairing concrete pavements in view of defense needs; type of construction being used in road repair work in Texas.

Military. Highway Requirements for Military Transport, W. C. Baker, Jr. *Thirteenth Nat. Asphalt Conference—Proc. Mtg. Dec. 9–13, 1940*, pp. 35–41. Standards of construction that have been set up for military roads; special requirements which roads for commercial transport must meet in order to service military needs.

Military. Military Roads in Forward Areas, W. N. Carey. *Thirteenth Nat. Asphalt Conference—Proc., Mtg. Dec. 9–13, 1940*, pp. 53–62. Author states his opinion of nature of problem of military roads in forward areas and gives his idea of organization, material, and equipment needed to solve it; suggestion made for set-up of special road battalions and recommended engineer road equipment for use by six of these battalions.

National Defense. Adapting Our Highway System to National Defense, T. H. MacDonald. *Thirteenth Nat. Asphalt Conference—Proc., Mtg. Dec. 9–13, 1940*, pp. 30–34. Discussion of types of roads strategically located for national defense; particular reference given to so-called access roads for army and navy encampments, rail terminals, airport, and industrial production areas and recommended procedure for their repair or reconstruction.

Road Machinery. Highway Equipment Use and Salvage in North Carolina, B. W. Davis. *Eng. News-Rec.*, vol. 127, no. 15, Oct. 19, 1941, p. 512. North Carolina Highway department operates equipment to maintain 10,000 miles of dustless road and 47,700 miles of hard surfaced roads; equipment valued at $7,500,000 is held by highway equipment department and is leased to other departments on rental basis which returns sufficient revenue from rent to pay cost of all overhead, repairs, and replacements.

Stabilization. Field Investigation of Low-Cost Stabilized Roads, D. J. Belcher. *Purdue Univ.—Eng. Bul.—Eng. Experiment Station—Research Series, No. 81*, vol. 25, no. 2a, Apr. 1941, 154 pp. Description of progress made to date in field investigation of some common materials used in stabilization; discussion of general procedures in stabilization; stabilized test road; contingent field studies; contingent laboratory studies.

Street Lighting. Street-Lighting Operating Experience in Pennsylvania, R. D. Zimmerman. *Elec. World*, vol. 116, no. 10, Sept. 6, 1941, pp. 52–53. Nine companies with 175,000 street lamps report on patrolling, renewal schedules, use of isolating transformers, time switch control, trouble with lead wires, maintenance of glassware, painting, and fault location. Before Penn. Elec. Assn.

Transportation, Burma–China. Communications Between Burma and China. *Engineering*, vol. 152, no. 3942, Aug. 1, 1941, p. 96. Discussion of four lines of communications: (1) By railway to Lashio and thence by road; (2) by road all way from Rangoon, following same route; (3) by river to Bhamo and thence by road; and (4) by rail to Mandalay or Katha, thence by river to Bhamo, and thence by road.

SEWERAGE AND SEWAGE DISPOSAL

Industrial Wastes. Some Views and Experiences on Treatment of Trade Wastes, M. E. D. Windridge. *Surveyor*, vol. 99, nos. 2571 and 2572, May 2, 1941, pp. 297–299, and May 9, pp. 315–316. Brief review of Public Health Drainage and Trade Premises Act 1937, main object of which is reduction of river pollution; article suggests ways and means of reducing pollution due to trade wastes in compliance with laws; consideration of flow and composition of trade wastes; suggested means of treating waste from artificial silk plants, board mills, gas liquor, milk, and yeast plants.

SPEED UP THESE DEFENSE JOBS

AIRPORT RUNWAYS

DEFENSE PLANT HIGHWAYS

ARMY CAMP STREETS

WITH

STANDARD OIL

ASPHALT

★ **WHEELS,** whether they are on planes, army trucks, or defense workers' cars, must have some place to roll—wide, smooth, all-weather surfaces to speed them on their way. Asphalt offers all of these, plus unusual speed and simplicity of construction. Here are a few reasons why:

- Asphalt roadways or runways can frequently be built with any local aggregate available. A big saving in transportation time and expense.
- Asphalt construction requires only equipment that is readily available in most counties, cities, or states in the Middle West.
- Asphalt surfaces may be built up to a wide variety of specifications, each designed for the traffic load and other local conditions to be met.
- Asphalt construction requires the shortest possible time from the start of the job to a traffic carrying finish.

Wherever Standard Oil Asphalt products are sold, there is a Standard Asphalt Representative who can give you full information about its application to your problem. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the representative nearest you.

Copyright 1942, Standard Oil Co. (Indiana)

ASPHALT FOR EVERY PURPOSE

STANDARD OIL COMPANY

(INDIANA)

PLANTS, DUST CONTROL. Dust, A. H. Goodman. *Safety Eng.*, vol. 82, no. 4, Oct. 1941, pp. 38, 40, and 42. Southwest Sewage Treatment Works of Sanitary District of Chicago handles input of 400,000,000 gal of sewage daily, which is equivalent to population load of 2,700,000; load is distributed over area of 192 gross sq miles; approximately 600 tons of coal are consumed daily in treating sewage; task of keeping plant clean and free of dust accumulations is important; article gives information on how this is accomplished.

SEWAGE ANALYSIS. Determination of Grease in Sewage, Sludge, and Industrial Wastes, R. Pomeroy and C. M. Wakeman. *Indus. & Eng. Chem.* (Analytical Edition), vol. 13, no. 11, Nov. 15, 1941, pp. 795–801. Prevailing methods for determining grease content of sewages, sludges, and liquid industrial wastes permit many errors; authors have devised procedure that eliminates or greatly reduces most of sources of error; application to various samples gave results with differences from means averaging 2.0%; results of analyses are much less influenced by variations of technique and of solvent than is case with older methods.

SEWAGE BACTERIOLOGY. Biology of Macro-Fauna of High-Rate Double Filtration Plant at Huddersfield, T. B. Reynoldson. *Surveyor*, vol. 99, nos. 2567 and 2569, Apr. 4, 1941, pp. 237–240 (discussion) Apr. 18, pp. 271–272. Study of biology of experimental filtration plant at sewage works at Deighton; survey conducted to indicate general biological trends in high rate bed, and also to determine whether such system will help to control psychoda fly; results indicate that double filtration system will accomplish fly control without treatment. Before Inst. Sewage Purification.

SLUDGE. Ueber die Verwertung des Abwasserschlammes, E. Sauer. *Chemiker-Ztg.*, vol. 65, no. 43/44, May 28, 1941, pp. 201–204. Utilization of sewage sludge; notes on mechanical and biological purification of sewage; composition of sludge; various methods of sludge utilization discussed.

STRUCTURAL ENGINEERING

DOMES AND SHELLS, STRESSES. Berechnung der Beanspruchung kreisfoermiger Ringspante, H. Fahlbusch and W. Weger. *Luftfahrtforschung*, vol. 18, no. 4, Apr. 22, 1941, pp. 122–127. Determination of stresses of circular bulkheads of constant resistance to bending, as occur in thin-walled shells, with consideration of finite height of bulkhead cross section; mathematical procedure is worked out and results are shown in diagrams.

ELECTRIC WELDING, STRUCTURAL STEEL. Welding Makes Continuity in Steel Work Advantageous, G. G. Landis. *Welding J.*, vol. 20, no. 9, Sept. 1941, pp. 620–621. Specific examples calculated to show how arc welding is used as means of making steel members continuous at cost which often makes use of continuity in steel work advantageous.

PLATES, BUCKLING. Buckling of Plates with Lateral Stiffeners, H. Yushan. *Roy. Aeronautical Soc.—J.*, vol. 45, no. 370, Oct. 1941, pp. 326–330. In case of short wide plates or plates with many lateral stiffeners, effect on buckling load due to conditions of support at two side edges will become less, and that due to conditions of support at end edges will become important, so that they can no longer be assumed to be simply supported; numerical results and plotted results are given.

PLATES, STRESSES. Non-Linear Boundary Value Problem of Buckled Plate, K. O. Friedrichs and J. J. Stoker. *Am. J. Mathematics*, vol. 63, no. 4, Oct. 1941, pp. 839–888. Development of methods for solving non-linear boundary value problem concerning buckling of thin elastic plate under forces acting in plane of plate.

RETAINING WALLS, DESIGN. Cantilever Retaining Walls, W. P. Edwards. *New Zealand Instn. Engrs.—Bul. & Proc.*, vol. 27, no. 2, July 1941, pp. 140–151. Graphs and tables for complete design of cantilever retaining walls from 5 to 25 ft high.

SHIPBUILDING, WELDING. Riveted vs. Welded Galvanized and Corrosion Resisting Steel Smoke Pipes, H. O. Klinke. *Welding J.*, vol. 20, no. 10, Oct. 1941, pp. 693–697. Fabrication of smoke stacks for war vessels assembled by resistance welding at Philadelphia Navy Yard; these smoke pipes are of cylindrical or elliptical shape from 25 to 40 ft high and with approximate diameter varying from 8 to 14 ft; they may be fabricated of galvanized or stainless steel sheet varying in thickness from 0.032 to 0.096 in. Before Am. Welding Soc.

STRESSES. Determining Springback, R. G. Sturm and B. J. Fletcher. *Product Eng.*, vol. 12, nos. 10 and 11, Oct. 1941, pp. 526–528 and Nov., pp. 590–594. Upon release of pressure applied to bend sheet or structural section, member springs back to relieve residual stresses; forming radius of die or block must be modified to compensate for springback so that final curvature will be to radius desired; equations and methods of procedure for making such calculations; step-by-step calculations for given example presented; stress strain curves given.

STRESSES. Method of Measuring Dynamic Stresses—Seeing Stress, J. J. Cadwell. *Wis. Engr.*, vol. 46, no. 1, Oct. 1941, pp. 8–9. Brief description of general technique and photoelastic method of stress analysis with special reference to determination of bending stresses in moving gear teeth; author points out that value of study lies in demonstration that photoelastic method of stress analysis can be used in solution of stress problems involving moving parts.

WALLS, DAMPNESS. Effect of Outdoor Exposure on Water Permeability of Masonry Walls, C. C. Fishburn, D. E. Parsons, and P. H. Petersen. *U. S. Bur. Standards—Building Matls. & Structures—Report BMS 76*, Aug. 15, 1941, pp. 1–21; see also *Pit & Quarry*, vol. 34, no. 5, Nov. 1941, pp. 53–54. Water permeabilities of about 100 small masonry wall specimens were measured before and after exposing them to weather for maximum period of 3 years; exposure did not have important effect on permeability of all-brick or brick-faced walls 8 in. or more in thickness; permeability of stucco-faced walls was slightly increased.

WELDED STEEL STRUCTURES, DESIGN. Welding for Stiffness, G. G. Landis. *Welding J.*, vol. 20, no. 8, Aug. 1941, pp. 533–535. Principal function of stiffness in structure is to resist side sway from wind or earthquake; illustrations and description of weld designs showing specific cases of tension and compression resistance when welding for lateral stiffness.

WELDS, STRESSES. Residual Stresses in Butt-Welded Steel Plates, G. H. R. Griffiths. *Welding J.*, vol. 20, no. 9, Sept. 1941, p. 410-S–414-S. Investigation was concerned with stresses which were created at right angles to butt weld in $^{5}/_{8}$-in. steel plate and their effect upon physical properties of plate when joint was transversely loaded in tension; in making up specimens different procedures of welding were used so that comparison could be drawn between each as well as with unwelded plate metal.

WELDS, STRESSES. Stresses and Overstresses in Welded Structures, D. Rosenthal. *Welding J.*, vol. 20, no. 9, Sept. 1941, pp. 414-S–416-S. Welded connections in which stresses and overstresses may appear are analyzed and discussed; author states that most efficient way to reduce deleterious effect of secondary stresses is to design welded structure in accordance with laws of strengths of materials and to execute them with last improvements of welding technique. From Dutch Welding Soc.

SURVEYING

MEASUREMENT. Measurement of Frustums, C. L. T. Griffith. *Engineering*, vol. 152, no. 3944, Aug. 15, 1941, pp. 127–128. Shortcomings of two methods used by surveyors pointed out and table presented; in which percentage errors of two methods are given for some values of ratio of area at small end of frustum to area at large end; it is believed method described is new theorem in mathematics of mensuration. From Soc. of Engrs.—Trans.

U.S. COAST AND GEODETIC SURVEY. United States Coast and Geodetic Survey. *Engineering*, vol. 152, no. 3943, Aug. 8, 1941, p. 118. Brief note on its duties and functions; one of most important tasks in recent years is that of surveying peninsula of Alaska and Aleutian Islands; 85 tide stations were maintained in operation during year, 41 being on Atlantic coast, 38 on Pacific coast, and 6 in Gulf of Mexico; continuous magnetic information was obtained at five observatories.

TUNNELS

ELECTRIC LIGHT AND LIGHTING. Mercury Vapor Lamps Light Turnpike Tunnels, L. A. S. Wood. *Elec. World*, vol. 116, no. 12, Sept. 20, 1941, pp. 58–59 and 131. Lighting coordinated to eliminate temporary blindness in driver entering Pennsylvania Turnpike tunnels day or night; open-type mercury luminaires installed in ceilings; sodium units installed at approaches and interchanges.

WATER TREATMENT

FILTRATION PLANTS, CHICAGO, ILL. World's Largest Water Filtration Plant, F. M. Belleau. *Mines Mag.*, vol. 31, no. 8, Aug. 1941, pp. 360–368. Features of Chicago's South District Water filtration plant; primary purpose of paper is to give students and graduates of Colorado School of Mines some idea of what some other graduates are doing; in addition to details of work on Contract No. 10, information is presented of work done by others, how plant is to operate, and what it is expected to accomplish when in operation.

MINNEAPOLIS, MINN. Softening Water at Minneapolis, J. A. Jensen. *Water Works Eng.*, vol. 94, no. 20, Sept. 24, 1941, pp. 1204–1208. Description of 120-mgd water-softening plant treating Mississippi River water; 12 Spaulding precipitators, each with normal capacity of 10 mgd, are used. Precipitators are constructed of concrete, and 12 basins occupy area of 296 by 379 ft; equipment and process described.

PREVENTING CORROSION. Progress in Water Conditioning Methods to Inhibit Corrosion, Committee Report. *Am. Water Works Assn.—J.*, vol. 33, no. 9, Sept. 1941, pp. 1534–1540. Committee report presents review of activities, including report on theory, practice, merits, and disadvantages of common methods of anti-corrosion treatment, being compiled from information obtained from operators and chemists; effect of changes in treatment on distribution system; effect of metaphosphates on distribution system; solution of lead by metaphosphates.

SEA WATER, SALT REMOVAL. Purification of Salt Water. *Engineering*, vol. 152, no. 3943, Aug. 8, 1941, p. 112. Urgent need for method of rendering sea water potable, which could be employed by crew of raft or open boat was set forth by correspondent of *The Times* and resulted in various suggestions being received, none of which seems to afford practical solution; more hopeful is process investigated 6 or 7 years ago based on properties of certain synthetic resins of absorbing various constituent salts in sea water from solution; process briefly described.

SOFTENING, ZEOLITE PROCESS. Carbonaceous Cation and Anion Exchangers in Water Treatment, S. J. Broderick. *U.S. Bur. Mines—Report Investigations*, no. 3571, June 1941, 14 pp. In 1934 it was discovered that carbonaceous materials such as coal, peat, and lignite, when treated with concentrated sulfuric acid, were given cation or base exchange properties; in same year, synthetic organic resin anion exchangers were produced in England; present report reviews all available information on carbonaceous exchangers, including patent data and information on synthetic resins.

TEXTILE MILLS. Nature, Properties and Use of Sodium Aluminate. *Textile Recorder*, vol. 59, no. 702, Sept. 1941, pp. 36 and 38. Sodium aluminate introduced in United States about 18 years ago as alkaline chemical to reduce priming and foaming in steam boilers, and success in this field led to further research which showed this chemical useful for coagulation of precipitated particles in lime soda process of water softening and for other technical purposes; lime soda process; role of sodium aluminate; theoretical considerations; applications. From books issued by Alfloc, Ltd.

WATER WORKS ENGINEERING

BLACKWELL, OKLA. Installing and Operating Settling Basin Baffle System, H. M. Frye. *Pub. Works*, vol. 72, no. 12, Dec. 1941, pp. 16–18. Brief description of Blackwell Water Works, Blackwell, Okla.; baffles and skimming walls used to create deeper settling zone and increase settling capacity; suggestions for methods of constructing baffles.

EDGEMONT, S. DAK. Sulfuretted Water Supplies City, L. K. Kopriva. *Water Works Eng.*, vol. 94, no. 21, Oct. 8, 1941, pp. 1264–1265. Source of water supply comes from two artesian wells, which furnish clear, sparking hot sulfur water, coming from depth of 3,000 ft; details of equipment and treatment which makes water potable for population of 1,000.

MAINTENANCE AND REPAIR. Million Dollar Improvements for Everett Water Supply. *Pub. Works*, vol. 72, no. 11, Nov. 1941, pp. 20 and 30. Improvements being made under Works Projects Administration, to supply Everett, Wash., with sufficient water to meet normal needs plus increased demands of stepped-up industries and airport construction, involving more than $1,000,000 of expenditures, are briefly described.

NEW JERSEY. Water Supply Defense in New Jersey, H. T. Critchlow. *Am. Water Works Assn.—J.*, vol. 33, no. 9, Sept. 1941, pp. 1517–1533. Report on extent and organization of New Jersey water supply with stress on its importance and strategic position in national defense; outline of defense measures of New Jersey water works; proposed essential interconnections to strengthen and protect water-works properties in case of emergency.

PAWHUSKA, OKLA. Solving Difficult Water Supply Problem, R. Lynch. *Pub. Works*, vol. 72, no. 10, Oct. 1941, pp. 15 and 44–45. Impounding reservoir on stream with drainage area inadequate to meet requirements of City of Pawhuska, Okla., is filled by pumping into from another stream; present plan of operation is to pump water from Clear Creek into city lake in the spring, and use lake water during August and September; pumps are operated electrically during off-peak periods; with lake full, water can flow to plant by gravity as required.

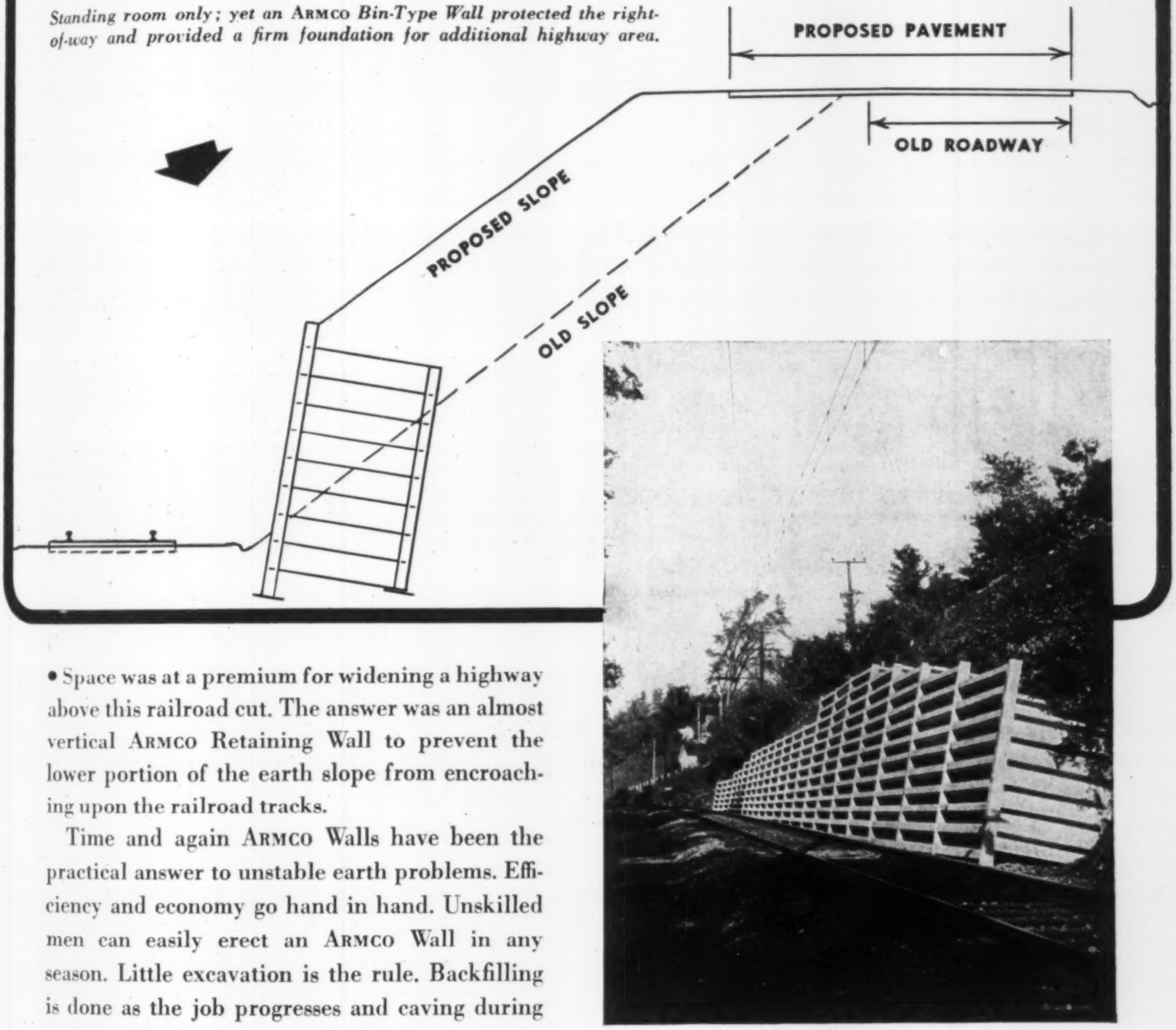
PROTECTION. Defense of Water Supply Works, N. J. Howard. *Am. Water Works Assn.—J.*, vol. 33, no. 9, Sept. 1941, pp. 1475–1480. Outline of general civil defense organizations in Canada and United States; importance of careful selection of personnel to combat sabotage to water-works properties; review of logical steps to be taken in protection against sabotage.

TANKS AND TOWERS, DESIGN. Special Design Features Tower Construction, F. Emory. *Southern Power & Industry*, vol. 59, no. 9, Sept. 1941, pp. 75–77. Outstanding design features of water storage tank to supply about 1,000,000 gal for domestic demand and hold reserve of 1,500,000 gal for fire protection at Tulsa, Okla.; analysis earth conditions for foundation, and welding data are discussed.

WATER TANKS AND TOWERS, RELOCATION. Skillful Operation to Move Water Tank, G. B. Beaumont. *Eng. & Contract. Rec.*, vol. 54, no. 16, Apr. 16, 1941, pp. 14–15 and 18. Particulars of moving as one unit, 41,600-gal tank and supporting frame, a distance of 13.09 miles in one day.

STANDING ROOM ONLY but the road went in!

Standing room only; yet an Armco *Bin-Type Wall protected the right-of-way and provided a firm foundation for additional highway area.*



• Space was at a premium for widening a highway above this railroad cut. The answer was an almost vertical Armco Retaining Wall to prevent the lower portion of the earth slope from encroaching upon the railroad tracks.

Time and again Armco Walls have been the practical answer to unstable earth problems. Efficiency and economy go hand in hand. Unskilled men can easily erect an Armco Wall in any season. Little excavation is the rule. Backfilling is done as the job progresses and caving during construction is prevented. And because Armco Bin-Type Walls are based on sound engineering design they have the strength to overcome unequal settlement. No danger of cracking or bulging.

Use Armco Retaining Walls as a ready solution for unstable slopes, right-of-way, stream erosion and similar problems. Ask us to send you specific data on that next job. Armco Drainage Products Association, 165 Curtis St., Middletown, Ohio.

ARMCO Bin-Type RETAINING WALLS

FOUNDATIONS
PRETEST UNDERPINNING
TUBA STEEL CYLINDERS
MASS CONCRETE CONSTRUCTION

SPENCER, WHITE & PRENTIS, INC.
NEW YORK, N. Y.

NEW TUBULAR AND PIPE PILING
FOR IMMEDIATE SALE

5000 ft. 10³/₄" O.D. 40′ to 50′ Lengths Tubular—Necessary Sleeves and Pile Points.

200 ft. 12³/₄" O.D. Black Steel Pipe Piles—Random Lengths—Necessary Sleeves and Pile Points.

1400 ft. 12" O.D. Armco Spiral Weld Pipe Piles No. 7 Gauge — Random Lengths — Necessary Sleeves and Pile Points.

Above piling now located Herkimer and Norwich, New York.

Inquire

Lane Construction Corporation
Meriden, Connecticut

AMERICAN SOCIETY OF CIVIL ENGINEERS FOUNDED 1852

Why do so many ENGINEERS ask for all 24 of the ASCE MANUALS?

These Manuals of Engineering Practice, compiled by men of wide experience and acknowledged authority, contain information useful to the civil engineer in his every-day work. They present facts, briefly and to the point, and should be of value to you. You can get the list of Manuals published to date by mailing the coupon.

American Society of Civil Engineers
33 West 39th Street, New York, N.Y.

Please send, without obligation, complete list of 24 Am. Soc. C.E. Manuals.

Name . . . .
Address . . . .
City . . . . State . . . .

Literature Available

ARC WELDING—"Practical Lessons in Arc Welding," by W. J. Chaffee, a concise book containing forty-two complete arc welding lessons, stressing practice as the means for acquiring welding proficiency, is published by Hobart Brothers Co., Troy, Ohio.

BULLDOZERS AND GRADE-BUILDERS—Complete specifications and candid shots of their equipment at work on highways, flood control, soil conservation, defense, housing, stripping, bridge approach grading, pit work, and other projects are given in a 28-page bulletin, No. 834, just issued by the Baker Manufacturing Co., Springfield, Ill.

DIPPERS—"Shovel Output Begins with the Dipper"—a booklet telling the importance of dippers to shovel output, and provided with pictures showing both construction details and performance, may be obtained by writing to Publicity Dept., Bucyrus-Erie Co., South Milwaukee, Wis.

ELECTRIC DRILLS—"The Fast, Modern Way to Drill," a new bulletin showing the latest U14 type ¹/₄ in. capacity, small light one-hand electric drills, has just been issued by the Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago, Ill.

MATERIALS HANDLING—Electric motors and controls for cranes, hoists, and gantry bridges are described in a new 20-page booklet, B-2264. Westinghouse Electric & Mfg. Co., East Pittsburgh, Penna. Features of a-c and d-c motors up to 600 hp for materials handling operations are discussed, with notes on gear motor applications, controllers, protective devices, and methods of motor braking.

SHOVELS—Bulletin 54-B-4 is said to be a complete, visual answer to any question likely to be asked about 54-B power shovel design and construction. Publicity Dept., Bucyrus-Erie Co., South Milwaukee, Wis.

STEEL FLOORING—"New Ideas in Functional Floor Design" is the title of a 16-page handbook on the many uses of open steel floor grating just published by Dept. YY, Open Steel Flooring Institute, American Bank Bldg., Pittsburgh, Penna.

WHEEL TRACTOR—The new "Caterpillar" Diesel DW10 Tractor, a heavy-duty, high-speed hauling unit, is featured in an illustrated color broadside published by Caterpillar Tractor Co., Peoria, Ill.

WHITE CEMENT—A study of white cement and pertinent facts about its many uses are clearly explained in a convenient little handbook just published by the Trinity Portland Cement Co., Dallas, Texas. Trinity White is now being sold nationally.

WIRE ROPE—A book of specifications which shows exactly the wire rope to use on all parts of principal construction machines is entitled, "Helping Speed Construction." Hazard Wire Rope Division, American Chain & Cable Co., Inc., Wilkes-Barre, Penna.

DIXON'S ELDORADO HB

A line as black as night!

Typhonite Eldorado Pencils make such lines! Opaque lines! Lines firm and solid, lines as black as a black feline. This is the kind of line wanted in today's drawings—because today's blueprints must be clean as the path of a bullet.

Why is the *Typhonite* Eldorado line so opaquely black? Simply because the Eldorado's lead is *Typhonite.* No other drawing pencil has *Typhonite* leads. *Typhonite* is created out of natural graphite by an exclusive Dixon process. Try *Typhonite* Eldorado Pencils in any of the 17 degrees of your choice.

TYPHONITE
ELDORADO

This interesting, informative booklet, a little history of pencil making, is yours for the asking. Please write on your business or professional stationery.

Pencil Sales Department **38-J2**
JOSEPH DIXON CRUCIBLE CO. · JERSEY CITY, N. J.

WATER FOR A NATION AT WAR!

To the East and to the West, we are looking straight into the cannons of war. From within we face the inevitable saboteur. It is time to become grim, cautious and determined in our war aims and actions. We must win this war and do a good job of it. We will fight with men, metals, fuel, power, food, water and materials of all kinds.

Never before has water been a more vital necessity. Beyond its task of serving men, materials and machines, water now also must guard against fire . . . protect factories, equipment, supplies, homes . . . and lives.

As in the strenuous days of defense preparation, Layne now is ready, fully equipped and speedily engaged in an even greater task . . . that of providing water for a Nation at war. This activity includes service to the Military and Naval forces, essential industries and necessary repair work.

Check your water supply and install necessary wells and pumps. See that all present wells and mechanical equipment are placed in good order and kept ready for any emergency. Repairs to existing equipment will conserve material needed for war purposes.

LAYNE & BOWLER, INC.
Memphis, Tenn.

LAYNE PUMPS & WELL WATER SYSTEMS

Affiliated Companies

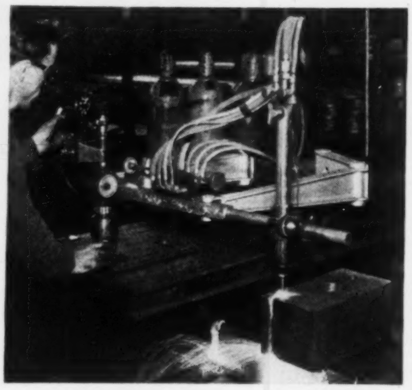
Layne-Arkansas Company............Stuttgart, Ark.
Layne-Atlantic Company..............Norfolk, Va.
Layne-Central Co.........................Memphis, Tenn.
Layne-Northern Company........Mishawaka, Ind.
Layne-Louisiana Company......Lake Charles, La.
Layne-New York Co...................New York City.
Layne-Northwest Company......Milwaukee, Wis.
Layne-Ohio Company................Columbus, Ohio
Layne-Texas Company...............Houston, Texas.
Layne-Western Company..........Kansas City, Mo.
Layne-Western Co. of Minn......Minneapolis, Minn.
Layne-Bowler New England Corp...Boston, Mass.
International Water Supply, Ltd...London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

Equipment and Materials

Oxyacetylene Tip Increases Cutting Speed

A SERIES OF oxyacetylene machine cutting tips of revolutionary design increase the cutting speed of machine torches by 20 to 30 per cent and assure cuts of a quality comparable to those obtained with standard tips. These tips, developed by Air Reduction, 60 E. 42nd St., New York, N. Y., represent a timely development because of the increased speed in war production which they make possible.



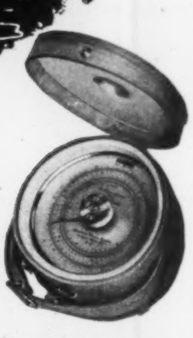
The Airco "45" high speed machine cutting tip has a nozzle with a divergent exit portion—a design that makes it possible to eject a narrow, high velocity stream of oxygen, practically free of exit turbulence, that burns a narrower path or kerf than the conventional cutting tip. As a result of burning away less width of metal in a cut, the Airco "45" cuts with no increase in oxygen consumption.

To obtain a kerf of narrower width than that obtained in standard cutting practice, it is necessary to use a narrow, parallel-walled oxygen stream. This is obtained when a high operating pressure is used in the Airco "45" divergent tip that reduces the exit turbulence of the oxygen stream. As the oxygen stream penetrates steel, its velocity is constantly dissipated. The divergent tip principle increases the velocity of the oxygen stream, and provides a higher oxygen concentration at greater depths, thereby increasing the oxidation rate of the metal being cut. This makes cutting with Airco "45" a faster and more economical process.

Airco "45" high-speed machine cutting tips are available in sizes 0, 1, 2, 3, 4, 6, 8 and 10 for cutting metal thickness up to 8 inches. The tips fit standard machine cutting torches. To increase cutting speeds 20 to 30 per cent, it is only necessary to substitute one of the new divergent tips for the conventional style tip.

SHOVEL—A new 4-page folder, No. 1914, illustrating and describing its $^1/_2$-yd Model LS-50 crawler shovel-dragline-crane, has just been published by Link-Belt Corp., 301 West Pershing Road, Chicago, Ill.

Speed-Up ALL FIELD SURVEYS!



Preliminary surveys for highway construction, drainage and irrigation systems, dams, water lines, all divisions of civil engineering are speeded up by the *NEW* Paulin Precision Surveying Aneroid. Readings to two feet over a range of 4500 feet are as easy as reading a watch. Other models cover a range of **18,000** feet. Write for complete literature and FREE COPY of the *Paulin Altimetry Manual.*

AMERICAN PAULIN SYSTEM
1847 SOUTH FLOWER STREET
LOS ANGELES, CALIFORNIA

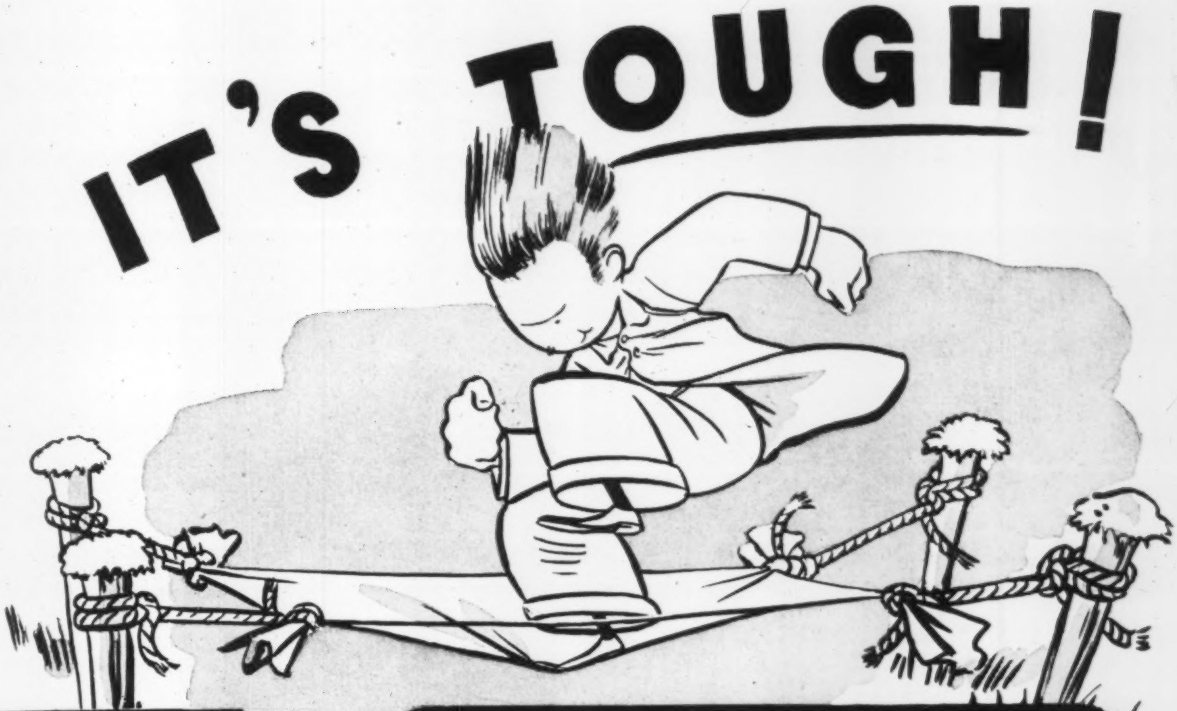
ANY BRIDGE

IS A BETTER BRIDGE when Kerlow Bridge Grating (open or filled) is installed on the roadway and sidewalks. The advantages listed below are found in no other bridge floor.

REDUCES DEAD LOAD
INCREASES LIVE LOAD
NON-SKID AND EASY RIDING
ECONOMICAL AND DURABLE
EASILY AND QUICKLY INSTALLED

Our new reference book "BETTER FLOORS FOR BETTER BRIDGES" contains complete information and engineering data. May we send your copy today?

KERLOW STEEL FLOORING CO.
218-C Culver Avenue Jersey City, N. J.
Telephone BErgen 4-5560



NATIONWIDE NETWORK OF POST DEALERS

- **Atlanta**—Georgia Blue Print Co.
- **Birmingham**—James A. Head, Inc.
- **Boston**—Boston Blue Print Co.
- **Buffalo**—Buffalo Blue Print Co.
- **Chicago**—Frederick Post Co.
- **Cincinnati**—Queen City Blue Print Co.
- **Cleveland**—The City Blue Printing Co.
- **Dallas**—The Rush Co.
- **Dayton**—Gem City Blue Print & Supply Co.
- **Denver**—Kistler's
- **Detroit**—Frederick Post Co.
- **Fort Wayne**—Fort Wayne Blue Print & Supply Co.
- **Fort Worth**—Majestic Reproduction Co.
- **Houston**—Gulf Blue Print Co.
- **Indianapolis**—Indianapolis Blue Print & Litho Co.
- **Jacksonville**—A. R. Cogswell
- **Kansas City**—Western Blue Print Co.
- **Knoxville**—Sehorn & Kennedy
- **Los Angeles**—McKinney Blue Print Co.
- **Memphis**—Wray Williams Blue Print Co.
- **Milwaukee**—Frederick Post Co. of Wis.
- **New Orleans**—Southern Blue Print Co.
- **New York**—John R. Cassell Co., Inc.
- **Oklahoma City**—The A & E Equipment Co.
- **Omaha**—Standard Blue Print Co.
- **Philadephia**—Philadelphia Blue Print Co.
- **Pittsburgh**—American Blue Printing Co.
- **Portland**—J. K. Gill Co.
- **St. Louis**—Service Blue Print & Photo Copy Co.
- **Salt Lake City**—Salt Lake Blue Print & Supply Co.
- **Seattle**—Kuker-Ranken, Inc.
- **Tampa**—Office Equipment Company
- **Toledo**—Toledo Blue Print & Paper Co.
- **Tulsa**—Triangle Blue Print & Supply Co.
- **Washington, D. C.**—R. E. MacMichael
- **Wichita**—City Blue Print Co.

VAPO PAPER

FOR AMMONIA VAPOR PRINTS

POST

Rag Content Paper for "TOUGHER" Dry-Developed Prints

Switch to Vapo-paper for your ammonia vapor prints. It's tough and durable, and comes out of the machine fast—with all-white backgrounds clean as a hound's tooth. The new rag content Vapo-paper stock stands up under long, hard use—and the new Vapo-paper emulsion brings out *all* the sharp, contrasty fine line details and heavy solids, deeply colored in blue or Post red. No clouds—no blurs—no fadeouts. Try it out today. Two speeds, regular and fast.

GET YOUR FREE TRIAL NOW

At our expense, prove to yourself the superiority of Vapo-paper. At the left is the name of your Post dealer. 'Phone him for your free trial supply of Vapo-paper—and be sure to tell him the Serial Number of your developing machine. Or send direct for your supply to The Frederick Post Company, Box 803, Chicago, Ill.

PHONE POST AND PEP-UP PRODUCTION

INSTRUMENTS • EQUIPMENT • BLUE PRINT PAPERS • KINDRED SENSITIZED PRODUCTS

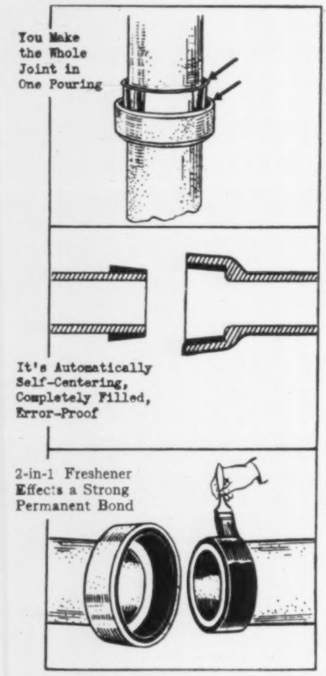
POST

JUST PHONE OR WRITE
YOUR NEAREST POST MAN

SECURE BETTER SEWER PIPE JOINTS

with Servicised 2-in-1 Die Cast Method

Newest scientifically tested method of jointing sewer pipes in record time! This important development reduces 2/3 of the time required by previous methods—and is operated by only one man.


You Make the Whole Joint in One Pouring
It's Automatically Self-Centering, Completely Filled, Error-Proof
2-in-1 Freshener Effects a Strong Permanent Bond

This method is more economical than ordinary methods because labor is reduced at the time of making the joint and matching it in the trenches. Maintenance cost is low as a result of using this procedure because the joints are 100% filled and the perfect bond that is effected by this material between each pipe is durable, flexible and root-repellant.

We urge you to consider this improved 2-in-1 Die Cast Method knowing that it will create goodwill among all those concerned.

We have company representation in principal cities. A nearby representative will gladly assist you immediately upon request—or you may send for further information and descriptive literature today.

SERVICISED PRODUCTS CORPORATION
6051 West 65th Street Chicago, Illinois

INDEX OF PRODUCTS

ACETYLENE
Air Reduction Sales Co.

ACETYLENE GENERATORS
Air Reduction Sales Co.

AERIAL CABLEWAYS AND TRAMWAYS
Wickwire Spencer Steel Co.

AIRPORT DRAINAGE
Armco Drainage Products Assn.
Lock Joint Pipe Co.

ALTIMETERS
American Paulin System

ALUMINUM, STRUCTURAL
Aluminum Co. of America

ARC WELDING EQUIPMENT
Lincoln Electric Co.

ASPHALT
Standard Oil Co. (Indiana)

ASPHALT AND RUBBER COMPOUNDS
Servicised Products Corp.

ASPHALT PLANK BRIDGE AND INDUSTRIAL FLOORING
Philip Carey Mfg. Co.
Servicised Products Corp.

BARS, ALUMINUM
Aluminum Co. of America

BARS, IRON AND STEEL
Carnegie-Illinois Steel Corp.

BARGES, STEEL
Chicago Bridge & Iron Co.

BATCHING AND WEIGHING EQUIPMENT, CONCRETE
Scientific Concrete Service Corp.

BELTING, METAL, CONVEYOR
Wickwire Spencer Steel Co.

BINS, STORAGE
Chicago Bridge & Iron Co.

BLOWER PIPE, STEEL, FOR VENTILATION PURPOSES
Lock Joint Pipe Co.

BLUE PRINT PAPERS
Frederick Post Co.

BOOKS, TECHNICAL
John Wiley & Sons, Inc.

BORINGS, TEST
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

BRICK, PAVING
National Paving Brick Assn.

BRIDGE FLOORS, GRATING
Kerlow Steel Flooring Co.

BRIDGE PLANKS, MINERAL SURFACED ASPHALT
Philip Carey Mfg. Co.
Johns-Manville Corp.

CABLES, ELECTRIC
Lincoln Electric Co.

CAISSONS
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

CEMENT, HIGH - EARLY - STRENGTH Portland
Lone Star Cement Corp.

CEMENT, PORTLAND
Lone Star Cement Corp.
Portland Cement Assn.

CONCRETE ADMIXTURES
Johns-Manville Corp.

CONCRETE REINFORCEMENT
Carnegie-Illinois Steel Corp.
Wickwire Spencer Steel Co.

CONSTRUCTION EQUIPMENT
Scientific Concrete Service Corp.

CONTRACTORS
Lane Construction Corp.
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

CORRUGATED SHEETS, ALUMINUM
Aluminum Co. of America

CORRUGATED SHEETS, ASBESTOS-CEMENT
Johns-Manville Corp.

CRIBBING, METAL
Armco Drainage Products Assn.

CULVERTS, ASBESTOS-CEMENT
Johns-Manville Corp.

CULVERTS, CAST IRON
Cast Iron Pipe Research Assn.
U. S. Pipe & Foundry Co.

CULVERTS, CORRUGATED IRON AND SHEETS
Armco Drainage Products Assn.

CULVERTS, REINFORCED CONCRETE
Lock Joint Pipe Co.

DAMP-PROOF COMPOUNDS
Barrett Division, Allied Chemical and Dye Corp.
Philip Carey Mfg. Co.

DRAFTING INSTRUMENTS AND MATERIALS
Keuffel & Esser Co.
Frederick Post Co.

DRAFTING ROOM FURNITURE
Frederick Post Co.

DRAINS, PERFORATED IRON
Armco Drainage Products Assn

DRAINS, REINFORCED CONCRETE
Lock Joint Pipe Co.

DRAWING SUPPLIES
Joseph Dixon Crucible Co
Keuffel & Esser Co.

ENGINEERS
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

ENGINEERING INSTRUMENTS
American Paulin System
Keuffel & Esser Co.

ENGINEERING TAPES AND SCALES
Frederick Post Co.

EXPANSION JOINTS, ASPHALT OR CORK
Johns-Manville Corp.

EXPANSION JOINTS, ASPHALT, CORK OR RUBBER
Servicised Products Corp.

FILLER, ASPHALT
Philip Carey Mfg. Co.

FLOOR TILE, RUBBER AND CORK
Servicised Products Corp.

FLOORING, ALUMINUM
Aluminum Co. of America

FLOORING, ASPHALT TILE
Johns-Manville Corp.

FLOORING, GRATING
Kerlow Steel Flooring Co.

FLOORING, STEEL
Carnegie-Illinois Steel Corp.

FLUX, WELDING, BRAZING, ETC.
Air Reduction Sales Co.

FOUNDATIONS
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.
Union Metal Manufacturing Co.

GALVANIZING AND GALVANIZED PRODUCTS
Enterprise Galvanizing Co.

GASHOLDERS
Chicago Bridge & Iron Co.

GAUGES, ACETYLENE, OXYGEN
Air Reduction Sales Co.

GENERATORS, ELECTRIC
Lincoln Electric Co.

GRATING, STEEL FLOORING
Kerlow Steel Flooring Co.

INKS, WATERPROOF, PIGMENT, DRAWING
Keuffel & Esser Co.

INSTRUMENTS
American Paulin System
Buff & Buff Co.
Keuffel & Esser Co.

JOINTS, EXPANSION, PAVING
Barrett Division, Allied Chemical & Dye Corp.
Philip Carey Mfg. Co.

LETTERING GUIDES
Keuffel & Esser Co.

LEVELS
Buff & Buff Co.
Keuffel & Esser Co.

MACHINERY, PIPE CUTTING AND BEVELLING
Air Reduction Sales Co.

MEASURING TAPES
Keuffel & Esser Co.

METAL CONNECTORS FOR TIMBER JOINTS
Timber Engineering Co.

METAL TERMITE SHIELDS
Timber Engineering Co

METERS, ELECTRIC
Lincoln Electric Co.

MOTORS, ELECTRIC
Lincoln Electric Co.

NICKEL AND ITS ALLOYS
International Nickel Co., Inc.

Continued on page 36

WE ALWAYS COME THIS WAY, TOO...
YES, THESE MODERN BRICK PAVEMENTS ARE FINE!

Smooth riding comfort . . . combined with the longest life and lowest upkeep of any widely used pavement.

Always the least costly . . . now the best riding

A swift succession of important advances in brick pavement construction have followed each other throughout the past few years.

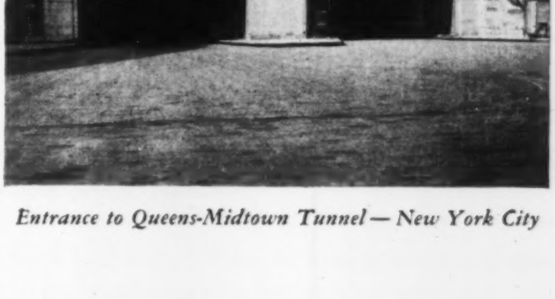
Result: Modern brick pavements are unexcelled in riding qualities.

There have been advances in technique such as surface filler removal and rolling on boards. There have been basic structural improvements such as the mastic cushion and manufacturing progress such as wire-cut vertical fibre wearing surfaces and de-airing.

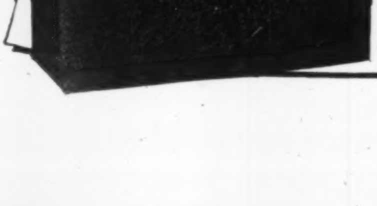
Hence, modern brick is a streamlined version of the pavement type that has longest life and lowest maintenance.

This progress comes at a time when it is most useful. For now it is known that brick has by far the greatest resistance to weather damage—starting point of most pavement failures.

Today, modern brick is the perfect surface for any vehicles at any speed plus the lowest cost per year of service. Use it wherever a first-class pavement is called for. National Paving Brick Association, National Press Building, Washington, D. C.

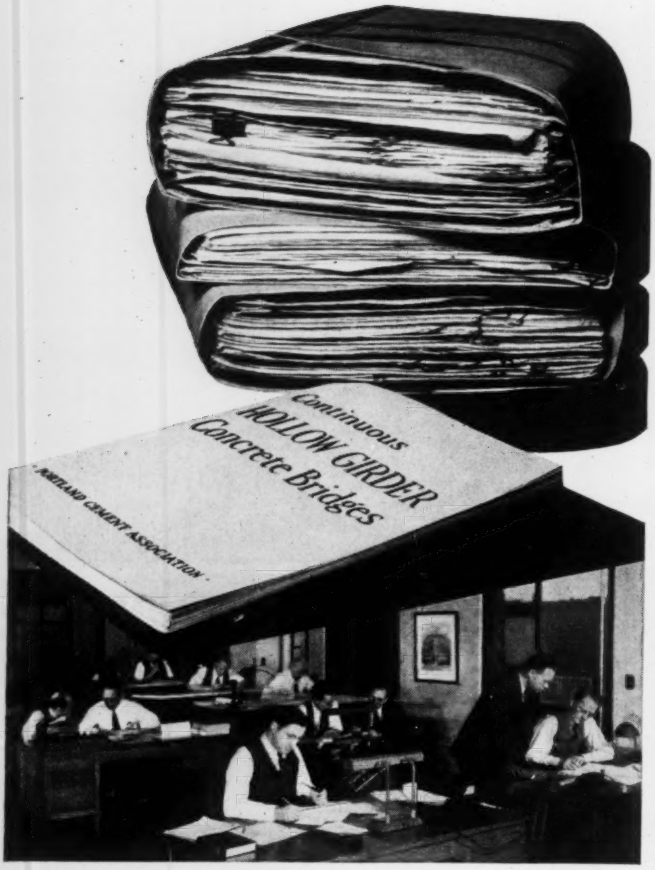


Entrance to Queens-Midtown Tunnel — New York City



VITRIFIED **BRICK**

THE MOST SATISFACTORY PAVEMENT



Not all research is done in a laboratory! Our staff spent thousands of hours, made reams of calculations

...to help you save time in designing

CONTINUOUS HOLLOW GIRDER CONCRETE BRIDGES

The new booklet—*"Continuous Hollow Girder Concrete Bridges"*—is a compact piece of printing. But its preparation was a year-long job for our technical staff, involving a review of the experience of leading engineers with this type of bridge, and extensive calculations and notes.

Every designer who has the previous booklet, *"Continuous Concrete Bridges,"* will want this new companion piece on hollow girder design. The simple methods set forth in the earlier work are here applied to larger spans. Special features of hollow girder design and construction that differ from those of shorter spans are treated in detail.

This booklet will apply to long spans the inherent advantages that have brought continuous concrete bridges so rapidly to the fore. Write today for your copy (sent free in U. S. or Canada).

PORTLAND CEMENT ASSOCIATION
Dept. 2-13, 33 W. Grand Ave., Chicago, Ill.
Please send booklet *"Continuous Hollow Girder Concrete Bridges."*
*Name*________________
*Firm Name*________________
*Address*________________
*City*________________ *State*________

INDEX OF PRODUCTS

Continued from page 34

OXYGEN
Air Reduction Sales Co.

PAINTS
Barrett Division, Allied Chemical & Dye Corp.

PAINT PIGMENT, ALUMINUM
Aluminum Co. of America

PAPER, DRAWING AND TRACING
Keuffel & Esser Co.

PAVING MATERIALS
Barrett Division, Allied Chemical & Dye Corp.
Lone Star Cement Corp.
National Paving Brick Assn.
Portland Cement Assn.
Standard Oil Co. (Indiana)

PENCILS
Joseph Dixon Crucible Co.

PENSTOCKS,
Chicago Bridge & Iron Co.
Lock Joint Pipe Co.

PERFORATED METAL
Wickwire Spencer Steel Co.

PILES, CONCRETE
Raymond Concrete Pile Co.
Union Metal Manufacturing Co.

PILES, STEEL BEARING
Carnegie-Illinois Steel Corp.

PILES, STEEL SHELL
Lane Construction Corp.
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.
Union Metal Manufacturing Co.

PILING, STEEL SHEET
Carnegie-Illinois Steel Corp.
Union Metal Manufacturing Co.

PIPE, ASBESTOS-CEMENT
Johns-Manville Corp.

PIPE, CAST IRON
Cast Iron Pipe Research Assn.
U. S. Pipe & Foundry Co.

PIPE, REINFORCED CONCRETE
Lock Joint Pipe Co.

PIPE, STEEL
Chicago Bridge & Iron Co.

PIPE COATING, ASPHALT
Standard Oil Co. (Indiana)

PIPE FITTINGS, CAST IRON
Cast Iron Pipe Research Assn.
U. S. Pipe & Foundry Co.

PIPE WRAPPING, ASBESTOS FELT
Johns-Manville Corp.

PLASTIC, ASPHALT
Philip Carey Mfg. Co.

PLATE WORK
Chicago Bridge & Iron Co.

PORTLAND CEMENT
Lone Star Cement Corp.
Portland Cement Assn.

PORTLAND CEMENT, HIGH-EARLY-STRENGTH
Lone Star Cement Corp.

PUMPS
Layne & Bowler, Inc.

REGULATORS, OXYACETYLENE
Air Reduction Sales Co.

REINFORCEMENT FABRIC
Wickwire Spencer Steel Co.

ROAD OILS
Barrett Division, Allied Chemical & Dye Corp.
Standard Oil Co. (Indiana)

ROAD SURFACING MATERIALS
Barrett Division, Allied Chemical & Dye Corp.
National Paving Brick Asssn.
Standard Oil Co. (Indiana)

RODS, WIRE
Wickwire Spencer Steel Co.

ROOFING MATERIALS
Barrett Division, Allied Chemical & Dye Corp.
Philip Carey Mfg. Co.
Johns-Manville Corp.
Servicised Products Corp.

ROPE, WIRE
Wickwire Spencer Steel Co.

SCREENS, WOVEN WIRE
Wickwire Spencer Steel Co.

SEWER PIPE, REINFORCED CONCRETE
Lock Joint Pipe Co.

SEWER PIPE BELTS, PREMOULDED
Servicised Products Corp.

SEWER PIPE COMPOUND
Servicised Products Corp.

SHEETS, ALUMINUM
Aluminum Co. of America

SHEETS, ASBESTOS-CEMENT
Johns-Manville Corp.

SHEETS, IRON & STEEL
Carnegie-Illinois Steel Corp.

SHORING
Spencer, White & Prentis, Inc.

SPRINGS, EXTENSION, COMPRESSION TORSION OR FLAT
Wickwire Spencer Steel Co.

STACKS
Chicago Bridge & Iron Co.

STANDPIPES
Chicago Bridge & Iron Co.

STEEL, STRUCTURAL
Carnegie-Illinois Steel Corp.

STEPS, SAFETY GRATING
Kerlow Steel Flooring Co.

STORM SEWERS, CORRUGATED IRON
Armco Drainage Products Assn.

STRANDS, WIRE
Wickwire Spencer Steel Co.

SUBAQUEOUS INTAKES AND OUTFALLS, REINFORCED CONCRETE
Lock Joint Pipe Co.

SURVEYING INSTRUMENTS
American Paulin System
Buff & Buff Co.
Keuffel & Esser Co.

TANKS
Chicago Bridge & Iron Co.

TAR
Barrett Division, Allied Chemical & Dye Corp.

TECHNICAL BOOKS
John Wiley & Sons, Inc.

TERMITE SHIELDS
Timber Engineering Co.

TIMBER JOINT CONNECTORS
Timber Engineering Co.

TORCHES, WELDING AND CUTTING
Air Reduction Sales Co.

TRACING DUPLICATIONS
Frederick Post Co.

TRACK, INDUSTRIAL AND PORTABLE
Carnegie-Illinois Steel Corp.

TRANSITS
Buff & Buff Co.
Keuffel & Esser Co.

UNDERPINNING
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

WATERPROOFING MATERIALS
Barrett Division, Allied Chemical & Dye Corp.

WATERPROOFINGS, MEMBRANE
Philip Carey Mfg. Co.

WATER SUPPLY EQUIPMENT
Layne & Bowler, Inc.

WATER SUPPLY PIPE, REINFORCED CONCRETE
Lock Joint Pipe Co.

WEIGHING AND BATCHING EQUIPMENT, CONCRETE
Scientific Concrete Service Corp.

WELDING AND CUTTING APPARATUS
Air Reduction Sales Co.

WELDING MACHINES, ELECTRIC ARC
Lincoln Electric Co.

WELDING RODS AND WIRE
Lincoln Electric Co.

WELL WATER SYSTEMS
Layne & Bowler, Inc.

WIRE, FLAT, ROUND, SQUARE
Wickwire Spencer Steel Co.

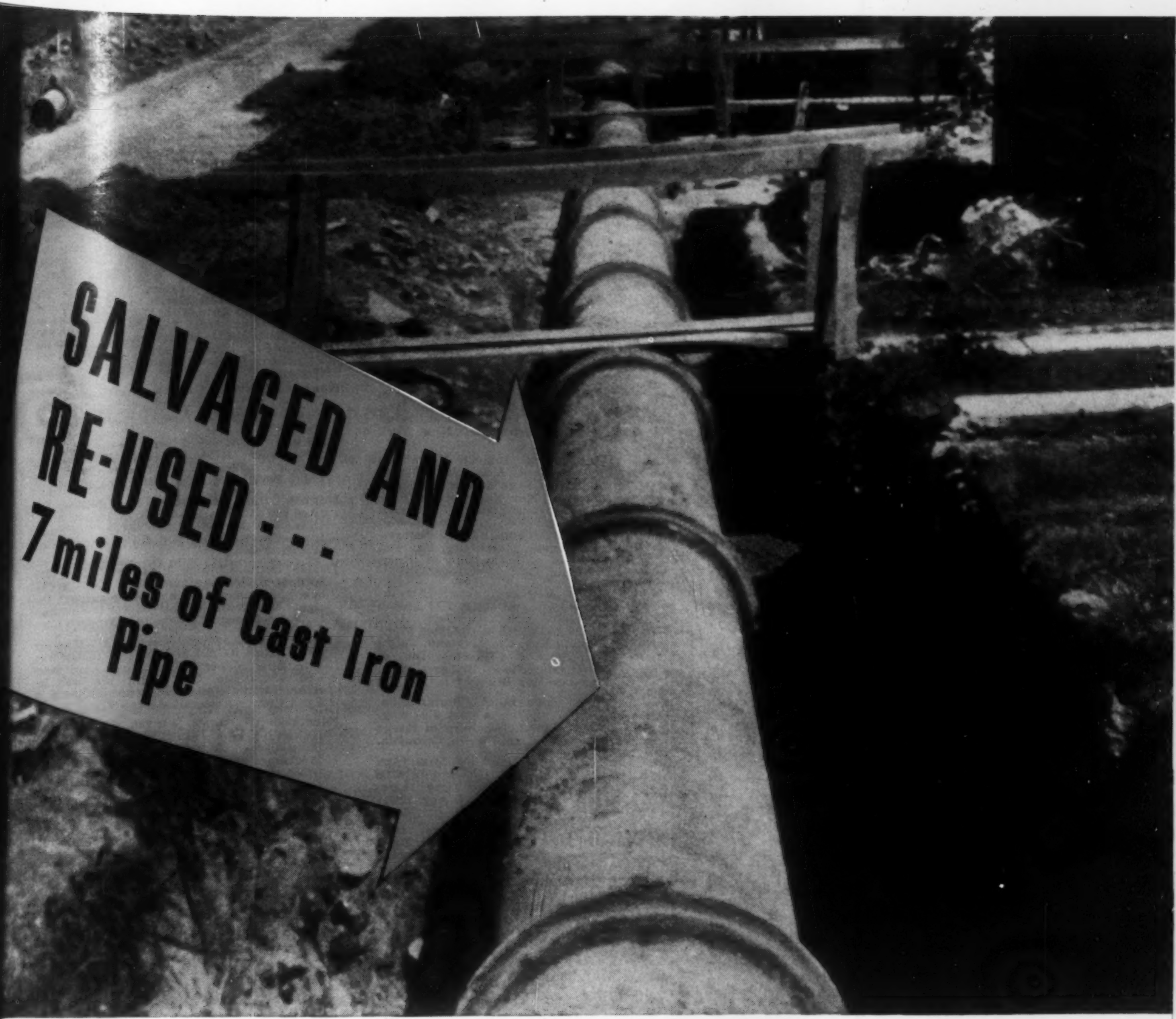
WIRE CLOTH
WICKWIRE SPENCER STEEL CO.

WIRE ROPE AND STRANDS
Wickwire Spencer Steel Co.

WOOD PRESERVATIVES
Barrett Division, Allied Chemical & Dye Corp.

Alphabetical Index to Advertisers shown on page 40

The Society reserves the privilege of rejecting advertisements inconsistent with its ethical procedure



Relocated 36-inch cast iron pipe at Reading, Pa.

READING, PA. wanted the new highway even if it meant abandoning a seven-mile-long water main ch had to be re-routed. The cost of a new cast iron line ld have been approximately $350,000.

Fortunately, the original line was cast iron. It could salvaged and re-used. It was. Seven miles of 30- to year old cast iron pipe in 24-inch, 30-inch and 36-inch meters were taken up, reconditioned and re-ated. The taxpayers of thrifty Reading were thereby saved a large amount of money. This is a striking example of the salvage and re-use value of cast iron pipe. But there are numerous other examples in the files of the Cast Iron Pipe Research Association.

It is impossible to foretell future requirements or population shifts in metropolitan cities but any public official can be sure that, when water or sewer mains must be abandoned or re-routed, the pipe can be salvaged or re-used, *if it is cast iron pipe.*

Pipe bearing this mark is cast iron pipe.

TRADE MARK REG.

Available in diameters from 1¼ to 84 inches.

ST IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1015 PEOPLES GAS BUILDING, CHICAGO, ILLINOIS

CAST IRON PIPE

PUBLIC TAX SAVER NO. 1

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Howard, John William, Everett, Mass. (Age 36) (Claims RCA 8.8 RCM 3.7) June 1935 to date Civ. Engr. (Civil Service), Eng. Dept., Everett, Mass.

Howard, Ralph Strong, Jr., Macon, Ga. (Age 34) (Claims RCA 4.0 RCM 1.7) Aug. 1935 to date with Georgia Dept. of Public Health, Atlanta, as Dist. Engr., Asst. Div. Engr., and (since June 1939) Malaria Investigations Engr.

Jackson, Hugh Hill, Jr., Diablo Heights, Canal Zone. (Age 28) (Claims RCA 3.8) Feb. 1940 to date Asst. Engr. (Constr.), Mun. Eng. Div., The Panama Canal; previously Asst. Res. Engr., Georgia Highway Dept.; Jun. Engr., SCS, U.S. Dept. of Agriculture.

Jové, José Antonio (Junior), Caracas, Venezuela. (Age 32) (Claims RCA 3.5) Sept. 1938 to date with Ministry of Health, 1 year as Chf. Engr., Div. of Rural Sanitation, remainder of time San. Engr. with Sanitary Eng. Service, and (since July 1940) with Div. of Sanitary Eng.

Kerr, James Eastham, Menlo Park, Calif. (Age 44) (Claims RCA 9.2) June 1941 to date Field Engr. and Road Constr. Supt., Barrett and Hilp, Mare Island, Calif.; Dec. 1938 to Feb. 1941 Store Mgr., Firestone Tire & Rubber Co.; previously Chf. of Party, FSA; Gen. Mgr. for Kerr Motors, Inc.

Koch, Wilhelm Emil, New Orleans, La. (Age 48) (Claims RCA 23.1 RCM 0.2) July 1923 to Sept. 1924 and Dec. 1928 to Jan. 1930 Engr., and Dec. 1940 to date Chf. Engr., George J. Glover Co., Inc., New Orleans; in the interim successively with Orleans (La.) Levee Board, Bureau of Reclamation, Denver, Colo., Bureau of Yards & Docks, Navy Dept., Superv. Engr.'s Dept. of Superv. Archt.'s Office, New Orleans Housing Authority, and with Edward F. Neild, Archt., Shreveport, La.

Kroup, Benjamin Adam, Prescott, Ark. (Age 33) (Claims RCA 4.1 RCM 2.1) Feb. 1938 to Sept. 1939 Engr., and July 1941 to date Field Supt., W. E. Callahan Constr. Corporation, Dallas, Tex.; in the interim with American Constr. Corporation, Amsterdam, N.Y., and R. C. Huffman Constr. Co., Buffalo, N.Y.

Le Moyne, Charles, Jr. (Junior), Bend, Ore. (Age 32) (Claims RCA 6.2 RCM 1.0) July 1933 to date with U.S. Bureau of Reclamation as Rodman, Chainman, Inspector, Asst. to Chf. of Party, Jun. Engr., and (since June 1939) Asst. Engr.

Lerch, Robert William, Harrisburg, Pa. (Age 41) (Claims RCA 8.1) Nov. 1940 to date on active duty with U.S. Army, as Capt., Quartermaster Corps.; Aug. 1924 to Nov. 1940 with Pennsylvania Dept. of Highways, Materials Div., Harrisburg, Pa., as Asst. Material Inspector, Laboratory Asst., Material Inspector, Senior Materials Inspector, and Materials Engr.

Levine, Benjamin, New York City. (Age 41) (Claims RCA 11.0 RCM 7.9) Sept. 1926 to Sept. 1931 and Nov. 1938 to date with Board of Transportation and Tunnel Authority, City of New York; in the interim Constr. Engr., Amtorg Trading Corporation, New York City.

Maierhofer, Charles Richard (Junior), Marshall Ford Dam, Tex. (Age 30) (Claims RCA 3.7 RCM 1.4) Dec. 1935 to date with U.S. Bureau of Reclamation as Transitman, Instrumentman, Party Chf. and Asst. Office Engr., Engr. Inspector, and (since Oct. 1940) Asst., Engr.

Marec, Giles Louis, New York City. (Age 39) (Claims RC 10.0 D 4.9) Dec. 1940 to date Structural Designer, Semet-Solvay Eng. Corporation; Feb. and June–Nov. 1940 Structural Engr., Taller & Cooper, Engrs. and Mfgrs.; March–May 1940 Structural Designer, H. G. Balcom Associates, Cons. Engrs.; previously Structural Designer and (later) Asst. Structural Engr., New York World's Fair, Inc.

Nelson, Henning F., Aurora, Colo. (Age 47) (Claims RCA 19.7 RCM 1.2) Dec. 1933 to date with U.S. Engr. Dept., Omaha (Nebr.) Dist., as Chf. Inspector, Dist. Cost Engr., and (since Dec. 1940) Project Engr., Lowry Field Project.

Noall, James Wesley (Junior), Olympia, Wash. (Age 32) (Claims RCA 1.8 RCM 4.8) May 1941 to date 1st Lt., QMC, U.S. Army; Feb. 1934 to April 1941 Computer, Levelman, Transitman and Res. Engr., Utah State Road Comm.

Parsons, Alfred Waugh, Portland, Ore. (Age 35) (Claims RC 4.6 D 2.6) Dec. 1941 to date Asst. Engr., Dist. Office, U.S. Army Engrs.; May to Dec. 1941 Asst. Engr., John W. Cunningham & Associates, Cons. Engrs., Portland; previously with U.S. Bureau of Public Roads, Portland, as Senior Levelman, Eng. Aide, Senior Eng. Aide, and Asst. Highway Engr.

Pilling, Alan Henry, Oceanside, N.Y. (Age 36) (Claims RCA 3.7 RCM 4.4) Feb. 1933 to Feb. 1937 Chf. Engr., and Feb. 1939 to date Sales Mgr., Richmond Screw Anchor Co., Inc.; in the interim Associate of L. O. Helgesen, L. O. Helgesen Co., New York City.

Plowe, Jason (Junior), Sacramento, Calif. (Age 33) (Claims RCA 4.9) Aug. 1931 to date with State of California as Senior Eng. Field Aide, Div. of Highways, Jun. Bridge Constr. Engr., and Asst. Bridge Engr., Bridge Dept., and (since March 1941) Associate Bridge Engr., Dept. of Public Works, Div. of Highways.

Posey, Carl Alfred, Chicago, Ill. (Age 35) (Claims RCA 4.4) Jan. 1942 to date Associate Airport Engr., CAA, Airport Div., Chicago, Ill.; July 1936 to Jan. 1942 with The Panama Canal, 1½ years as Constr. and Eng. Foreman, and 2 years as admeasurer.

Pritchard, John Aloysius, New York City. (Age 54) (Claims RCA 9.3) May 1941 to date Engr.-Specification Writer for E. B. Badger & Sons Co., Engrs. and Contrs.; previously Res. Engr. Inspector (PWA); Topographical Draftsman, Board of Transportation, New York City.

Quilty, Thomas Patrick (Junior), New York City. (Age 31) (Claims RCA 3.7) Jan. 1936 to Aug. 1938 and Feb. 1940 to date with Port of New York Authority, New York City, as Eng. Asst., Constr. Div., and (at present) Draftsman (Structural), Design Div.; in the interim Structural Designer, Tunnel Div., Pennsylvania Turnpike Comm., Harrisburg, Pa., and with Borough Pres. of Manhattan as Topographical Draftsman, Grade 3, Design Div.

Reynolds, Embree Ensign (Junior), Alexandria, Va. (Age 32) (Claims RCA 2.3) March 1940 to date Capt., Ordnance Dept., U.S. Army; June 1939 to March 1940 Office Mgr.-Estimator, Welding Eng. Co., Oakland, Calif.; previously with State of California, Div. of Highways, San Francisco, as Bridge Constr. Engr., San Francisco Bay Bridge.

Sanchez Bonilla, Eduardo A., Barranquilla, Colombia. (Age 31) (Claims RCA 7.9) Aug. 1936 to date Asst. Engr., Ministry of Public Works, Office of Navigation, Bogota, Colombia.

Sanders, James Edward, Vicksburg, Miss. (Age 35) (Claims RCA 5.8) Aug. 1930 to date with U.S. Engr. Office, as Inspector Eng. Aide, Jun. Engr., Asst. Engr., and (since Aug. 1941) Associate Engr.

Scofield, Walter Fleming (Junior), New Orleans, La. (Age 31) (Claims RCA 2.0) Sept. 1941 to date Asst. Prof. of Civ. Eng., Tulane Univ.; June to Sept. 1941 Engr. Designer, Lockwood & Andrews and David M. Duller; previously Instructor in Civ. Eng., The Rice Inst., Houston, Tex.; Asst. Res. Engr. with Black & Veatch.

Starr, John Thornton (Junior), Baltimore, Md. (Age 32) (Claims RCA 2.9 RCM 1.1) May 1936 to date with U.S. Engr. Office as Surveyman, Civ. Eng. Aide, Asst. Structural Engr., and (since Aug. 1941) Associate Civ. Engr.

Stewart, George Edward, Langley Field, Va. (Age 34) (Claims RCA 4.6 RCM 1.1) May 1935 to July 1937 2d Lt., Corps of Engrs.-Reserve, and Jan. 1941 to date 1st Lt., Corps of Engrs., U.S. Army; in the interim with Cherry-Burrell Corporation, Baltimore, as Engr. on research and machine design, and Factory Supt.

Swanson, Carl Gustave Walter, Jackson Heights, N.Y. (Age 33) (Claims RCA 6.3) June 1939 to date Associate Prin. Inspector with Public Works Officer, Brooklyn (N.Y.) Navy Yard; Feb. 1938 to April 1939 Transitman and Constr. Engr., Mene Grande Oil Co., Venezuela; previously Associate Res. Engr. Inspector, Inspection Div., FSA, Washington, D.C.

Tebow, Henry Jule, Jacksonville, Fla. (Age 33) (Claims RCA 6.0) Nov. 1940 to date Capt., Corps of Engrs., U.S. Army; previously with Bureau of Reclamation as Jun. Engr. (FCS9), and Asst. Engr. (FCS 10 and 11).

Turner, Leon Bela, Canton, Mass. (Age 40) (Claims RCA 4.8 RCM 4.7) Nov. 1921 to date with Fay, Spofford & Thorndike, Boston, Mass., as Transitman, Draftsman, Detailer, Res. Engr., Designer and Asst. to Res. Engr., Chf. Draftsman, and (since Jan. 1941) Chf. Draftsman in Eng. Office of Shreve, Lamb & Harmon-Fay, Spofford & Thorndike.

Wallace, Felix Anthony, Brooklyn, N.Y. (Age 30) (Claims RC 6.0 D 0.4) June 1940 to date Eng. Asst. (acting as Asst. Engr.), New York Transit System, BMT Div.; March 1930 to June 1940 with Brooklyn & Queens Transit Corporation, as Rodman, Instrumentman, Computer, Draftsman, Eng. Inspector, and Eng. Asst.

Weinroth, Max, Washington, D.C. (Age 38) (Claims RCA 11.9 RCM 4.3) June 1941 to date Engr. (Civ.) (P-4), Office of Chf. of Engrs., Washington, D.C.; June 1928 to June 1941 Jun. Engr. and Asst. Engr. (Civ.) (P-1 and P-2), U.S. Engr. Office, Philadelphia, Pa.

Zollner, Frederick Doering, Batavia, N.Y. (Age 32) (Claims RCA 7.9 RCM 0.5) Dec. 1933 to date with New York State Health Dept. as Jun. San. Engr., Asst. San. Engr., etc., and (since Jan. 1939) Dist. San. Engr.

APPLYING FOR JUNIOR

Carroll, George Edward, Los Angeles, Calif. (Age 27) Aug. 1939 to date with U.S. Engr. Dept, as Student Engr., Jun. Engr., and (since Sept. 1941) Asst. Engr.; previously Recorder, U.S. Geological Survey, Los Angeles, Engr. and Timekeeper with Frank S. Hodge.

Chan, Louis, Los Angeles, Calif. (Age 27) (Claims RCA 1.0) March to April 1939 and Aug. 1939 to date with U.S. Engr. Office as Axeman (Eng. Aide), Jun. Engr. (Hydr.), and (since Oct. 1941) Asst. Engr. (Hydr.); in the interim Eng. Draftsman, Eng. Div., FSA, San Francisco; previously with California Div. of Highways.

Harrill, Chivous Gilmer, Norfolk, Va. (Age 27) 1941 B.S. in C.E., Univ. of S.C.; July 1941 to date Structural Engr., Giffels and Vallet, Inc., Norfolk, Va.

Heckman, Joe Rowe, Liberty Center, Ind. (Age 25) (Claims RCA 0.4) 1941 B.S. in C.E., Purdue Univ.; Oct. 1941 to date Chf. of Sec., Foley Bros., Walbridge, Aldinger Co.

Horton, Harold Burris, New Orleans, La. (Age 28) (Claims RCA 0.7) 1941 B. of Arch., Okla. A. & M. Coll.; June 1941 to date Structural Engr., Wyatt C. Hedrick, Inc., Fort Worth, Tex.

Jacobs, Louis, Chicago, Ill. (Age 27) Nov. 1941 to date Archt. Draftsman, San. Dist. of Chicago; previously Archt. and Structural Designer, Structural Clay Products Inst.; Structural Draftsman, Universal Oil Products Co.

Nelson, Lee Edward, Kansas City, Mo. (Age 28) (Claims RCA 2.3) Feb. 1937 to date with U.S. Engr. Office as Jun. Engr., and (since Feb. 1941) Jun. Civ. Engr.; previously Instrumentman, Iowa State Local Control & Land Corner Restoration Project.

Nicholson, William Winter, Jr., Honolulu, Hawaii. (Age 24) 1940 B.S. in Civ. Eng., Miss. State Coll.; 1941 to date Jun. Engr. (Soil Mechanics and Civil), War Dept., U.S. Engr. Office.

Phillips, Henry Arthur, Hartford, Conn. (Age 31) Jan. 1937 to date Design Draftsman and Checker, Water Bureau, Metropolitan Dist. of Hartford.

Reck, Charles William, Ellenville, N.Y. (Age 28) 1941 B.C.E., Cooper Union; Sept. 1941 to date Jun. Engr., U.S. Geological Survey, Water Resources Branch.

Schutte, Laurent John, Port Henry, N.Y. (Age 26) (Claims RCA 1.0 RCM 0.3) Dec. 1941 to date Structural Engr., Republic Steel Corporation; June to Nov. 1941 Structural Designer, Albert Kahn, Inc.; Detroit, Mich.; previously Architectural Draftsman, Structural Designer, Supt., and Specification Writer, Lindl, Schutte & Lefebvre, Archts., Milwaukee.

Stollard, Julian Howard, San Francisco, Calif. (Age 29) Oct. 1941 to date Jun. Hydr. Engr., U.S. Geological Survey; previously Jun. Chemist at filtration plant at Atlanta (Ga.) Water Works.

Thornquist, Edwin Alton, Waterloo, Iowa. (Age 30) (Claims RCA 2.1 RCM 3.5) Dec. 1941 to date in private practice; formerly Chf. Draftsman, Engr. and Supt. of Constr. and Specifications with M. B. Cleveland, Archt., Waterloo; Chf. Draftsman and Constr. Supt., with W. J. Brown, Archt., Cedar Rapids.

1941 GRADUATES

UNIV. OF KANS.
(B.S. in C.E.)

	AGE
SHEARS, WILLIAM HENRY	(23)

MASS. INST. TECH.
(S.M.)

FUBINI-GHIRON, GINO (Also 1934 Doc. Civ. Eng., Royal Inst. Tech., Torino, Italy)	(30)

1942 GRADUATES

MO. SCHOOL OF MINES
(B.S. IN C.E.)

HOMYK, ANTHONY	(22)

APPLYING FOR AFFILIATE

Neumann, Frank, Silver Spring, Md. (Age 50) (Claims RC 17.0) 1911 to date with U.S. Coast and Geodetic Survey as Magnetic Observer, and (since 1920) Office Mathematician.

The Board of Direction will consider the applications in this list not less than thirty days after the date of issue.

PUBLIC TAX SAVER NO. 1

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

FOR "*HAPPY LANDINGS*"

STANDARD OIL ASPHALT

meets the need for speed

★ Asphalt construction requires the minimum amount of time from the start of a paving job to the final load carrying finish.

The pressing need for improved, safe, all-weather surfaces on airport runways, access roads to camp and defense plants, and army camp streets, makes this time-saving advantage of Asphalt doubly important right now.

For your regular highway improvement plans, Asphalt offers these other advantages:

- **Asphalt** roadways can frequently be built with any local aggregate available. A big saving in transportation time and expense.
- **Asphalt** construction requires only equipment that is readily available.
- **Asphalt** surfaces may be built up to a wide variety of specifications, each designed for the traffic load and other local conditions to be met.

Wherever Standard Oil Asphalt products are sold, there is a Standard Asphalt Representative who can give you full information about its application to your problem. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the representative nearest you.

Copyright 1942, Standard Oil Co. (Indiana)

AIRPORT RUNWAYS

ACCESS ROADS TO ARMY CAMPS

HIGHWAY WIDENING

ASPHALT FOR EVERY PURPOSE

STANDARD OIL COMPANY
(INDIANA)

Engineering Societies Personnel Service, Inc.

NEW YORK
31 W. 39TH ST.

CHICAGO
211 W. WACKER DR.

DETROIT
100 FARNSWORTH AVE.

SAN FRANCISCO
57 POST ST.

The items listed below have been furnished by the Engineering Societies Personnel Service, Inc., which is under the joint management of the Four Founder Societies. This service is available to members and is operated on a cooperative, non-profit basis. In applying for positions advertised by the Service the applicant agrees, if actually placed in a position through the Service as a result of these advertisements, to pay a placement fee in accordance with the rates as listed by the Service. These rates have been established in order to maintain an efficient, non-profit personnel service and are available upon request. This also applies to registrants whose notices are placed in these columns. All replies should be addressed to the key numbers indicated and mailed to the New York Office.

A weekly bulletin of engineering positions open is available to members of the cooperating societies at a subscription of $3 per quarter or $10 per annum, payable in advance.

MEN AVAILABLE

EXECUTIVE ENGINEER; M. Am. Soc. C.E.; married; no dependents; experienced in design and construction of dams, pipe lines, sewer systems, buildings, and filters; railway location; and construction of highways, hydroelectric power plants, and pumping stations; mining. Available at once. C-904.

CIVIL ENGINEER; M. Am. Soc. C.E.; 25 years executive experience, handling surveys, design, and construction for filtration, irrigation earth dams, roads, docks, jetties, dredging, and buildings. Assistant engineer, U.S. Bureau of Reclamation; director, Dominican Department of Public Works; industrial engineer, Indiana Limestone Company; manager and chief engineer, Salt-Soil Road Bureau. Speaks Spanish, Portuguese. Successful pioneer, especially in Spanish-America. C-905.

CIVIL ENGINEER; Jun. Am. Soc. C.E.; 22; single; B.C.E., New York University, College of Engineering, 1939; 2 years design of pump plants, dams, and buildings. Desires work in building (design or construction) field. Must be in Metropolitan Area. Available, two weeks' notice. C-906.

GRADUATE CIVIL ENGINEER; Jun. Am. Soc. C.E.; 29; married; 3 years highway experience; 5 years junior engineer, U.S. Engineer Corps and Public Roads Administration. Would like opportunity as structural engineer or as office engineer assisting contractor. Excellent scholastic records. Available on month's notice. C-907.

SUPERINTENDENT; Assoc. M. Am. Soc. C.E.; graduate engineer; licensed; experienced here and in foreign tropical countries, in responsible charge of extensive projects. Recently completed large ordnance project for well-known United States firm. Experience includes nearly all lines of construction encountered in large-scale construction. C-908.

POSITIONS AVAILABLE

DREDGING EXPERT with considerable experience. Prefer engineer who has had some salvaging experience. Will represent owners on two salvaging operations. Temporary. Salary open. Location, Middle West. Y-9036.

ENGINEER who is qualified and competent to design and assist in the preparation of plans and to supervise the work of a reinforced concrete seaplane ramp. Location, South. Y-9201.

STRUCTURAL DESIGNERS who have had good all-around experience. Should know reinforced concrete and structural steel. Salary open. Location, New York Metropolitan Area. Y-9470.

BUILDING INSPECTORS experienced on reinforced concrete. Salary, about $3,000 a year. Location, South. Y-9769.

GENERAL SUPERINTENDENT for work on large defense contracts. Should have experience on building work including finishing trades. Headquarters, New York, N. Y. Y-9770.

SALES ENGINEER with a knowledge of structural design who might also have the ability to contact architects, engineers, and contractors. Should not have been out more than six or seven years. Location, South. Y-9785.

COMPUTER AND DRAFTSMAN with experience on real estate subdivision work, making up small title surveys. This experience essential. Salary, $3,120–$3,380 a year. Location, South. Y-9797.

SURVEYORS, GEODETIC OBSERVERS (triangulation and leveling); Reconnaissance Observers, Photogrammetrists, and Draftsmen for mapping work. Salaries, $1,800–$3,000 a year. Headquarters, South. Y-9804.

STRUCTURAL STEEL AND CONCRETE DESIGNER who is capable of taking full responsibility for the design. Temporary. Interviews in New York. Location, Middle West. Y-9819.

CHIEF ENGINEER, graduate civil engineer, 40–55, well versed in heavy construction in both the design and field work. Salary, $8,000–$10,000 a year. Location, West Indies. Y-9820.

MECHANICAL AND CIVIL ENGINEERS with extensive and recent experience in the design of the appropriate phases of construction involved in the erection of large modern, reinforced-concrete, office building. Salary, $2,600–$3,200 a year. Also need Squad Leaders and Group Chiefs at $3,800–$4,600 a year. Location, South. Y-9823.

DRAFTSMEN (a) Senior Architectural Draftsman. (b) Structural Engineers for steel and reinforced concrete buildings. (c) Reinforced-Concrete Bar Detailers. Location, South. Y-9838.

DRAFTSMAN experienced in reinforced concrete, preferably. Salary open. Location, New York, N. Y. Y-9846.

STRUCTURAL DESIGNERS who have had experience on foundations, structural-steel mill-type buildings, dock, and shipways. Salary open. Location, New York, N. Y. Y-9878.

JUNIOR ENGINEER AND TECHNICAL CLERK, 21–25, on checking, coordinating, and expediting subcontractors. Some college training and a year of construction experience or more preferred. Salary, $1,820–$2,340 a year. Location, South. Y-9885.

ENGINEERS with a few years' experience in investigation and design of problems in water supply, distribution and treatment, sewerage, sewage pumping and treatment—especially men with recent design and drafting experience in these lines—to work with civil, mechanical, and electrical engineers who are available for consultation on their special aspects of sanitary engineering problems. Temporary. Salary, $3,200 a year. Location, South. Y-9888.

CIVIL ENGINEER, 35–45, graduate, experienced in bridge design and/or general construction design, to contact engineering and consulting organizations. Some traveling. Company car furnished. Headquarters, New York, N. Y. Salary, $3,600 a year. Y-9903.

DESIGNERS who have had considerable experience on all types of structural work. Company will need steel, reinforced concrete, drainage, water supply, plumbing, heating, and piping designers. Salary open. Location, New York State. Y-9915.

JUNIOR CONSTRUCTION ENGINEERS to act as transitman to give line and grade on foundation pile work; also to act as inspectors on the job. Salary, $2,600 a year plus overtime. Location, South. Y-9922.

STRUCTURAL DRAFTSMAN. Headquarters, New York, N. Y. Y-9927.

RECENT BOOKS

New books of interest to Civil Engineers donated by the publishers to the Engineering Societies Library, or to the Society's Reading Room will be found listed here. The notes regarding the books are taken from the books themselves, and this Society is not responsible for them.

THE ART OF CAMOUFLAGE. By C. H. R. Chesney. Robert Hale Ltd., London, written in 1939, published in 1941. 253 pp., illus., maps, 8 × 5 in., cloth, 8*s.* 6*d.*

Camouflage, "the art of concealing the fact that you are concealing," is thoroughly covered in this book. The first section discusses camouflage as practiced by creatures in their natural environment, and presents general considerations upon civil camouflage. The second section discusses the development of military camouflage in the first World War and future developments for both military and civil use. Strategic camouflage in military movements is demonstrated in the last section, with examples from campaigns. In this section and in an epilogue the author stresses also the political camouflage which will be used and which has been so amply demonstrated in recent times.

A.S.T.M. **STANDARDS ON RUBBER PRODUCTS**, prepared by A.S.T.M. Committee D-11 on Rubber Products. Methods of Testing, Specifications. December 1941. American Society for Testing Materials, 260 So. Broad St., Philadelphia, Pa., 1941. 280 pp., illus., diagrs., charts, tables, 9 × 6 in., paper, $1.75.

This annual publication gives in the latest approved form the specifications and methods of test adopted by the society. Among them are several new standards. There are also numerous revisions of earlier ones. There is a useful bibliography on the properties and testing of rubber.

✓ **BUILDING CONSTRUCTION**, Materials and Types of Construction, 2 ed. By W. C. Huntington. John Wiley & Sons, New York, 1941. 674 pp., illus., diagrs., charts, tables, $9^1/_2$ × 6 in., cloth, $6.

This book deals with the materials and types of construction used for the various parts of buildings, but not with the structural design except in its qualitative aspects. In the present edition particular attention has been paid to recent developments in our knowledge of soil behavior, foundations, brick cavity-walls, wood construction and connectors, steel welding, reinforced concrete arches and rigid frames, the protection of wood from termites, and the newer structural materials.

EGYPT, MINISTRY OF PUBLIC WORKS (Physical Department). **THE SUSPENDED MATTER IN THE NILE**, by Y. M. Simaika. (Physical Dept. Paper No. 40). Schindler's Press, Cairo, 1940. 70 pp., illus., diagrs., charts, tables, 11 × $7^1/_2$ in., cardboard, P.T. 20 or 4*s.*

This contribution to the problem of silt deposition presents the results of investigations on the solid matter carried along by the Nile in actual suspension, undertaken to learn the extent to which flood waters can be safely stored in the Aswan reservoir. The report describes the methods used to determine the amount of silt carried and to analyze it mechanically, and draws some tentative conclusions from the results. Suggestions for further studies are given.

GEOLOGY OF THE WESTERN SIERRA NEVADA BETWEEN THE KINGS AND SAN JOAQUIN RIVERS, CALIFORNIA. University of California, Dept. of Geological Sciences, Vol. 26, No. 2, pp. 215–286, plates 42–46. By G. A. Macdonald. University of California Press, Berkeley and Los Angeles, 1941. Illus., maps, charts, tables, $10^1/_2$ × 7 in., paper, $1.

The results of an extensive geological survey of the territory outlined are presented in this publication. Following a detailed description of the characteristic rocks and their distribution, come brief treatments of the economic geology, geologic structure, and geologic history of the region.

Great Britain, Dept. of Scientific and Industrial Research, Building Research. **WARTIME BUILDING BULLETIN** No. 17. His Majesty's Stationery Office, London, 1941. 9 pp., 11 × $8^1/_2$ in., paper. (Obtainable from British Library of Information, 30 Rockefeller Plaza, New York, 15 cents.)

This pamphlet is based upon an extensive survey of damaged buildings, research data, and other information. Damages from explosions

2042 A.D.

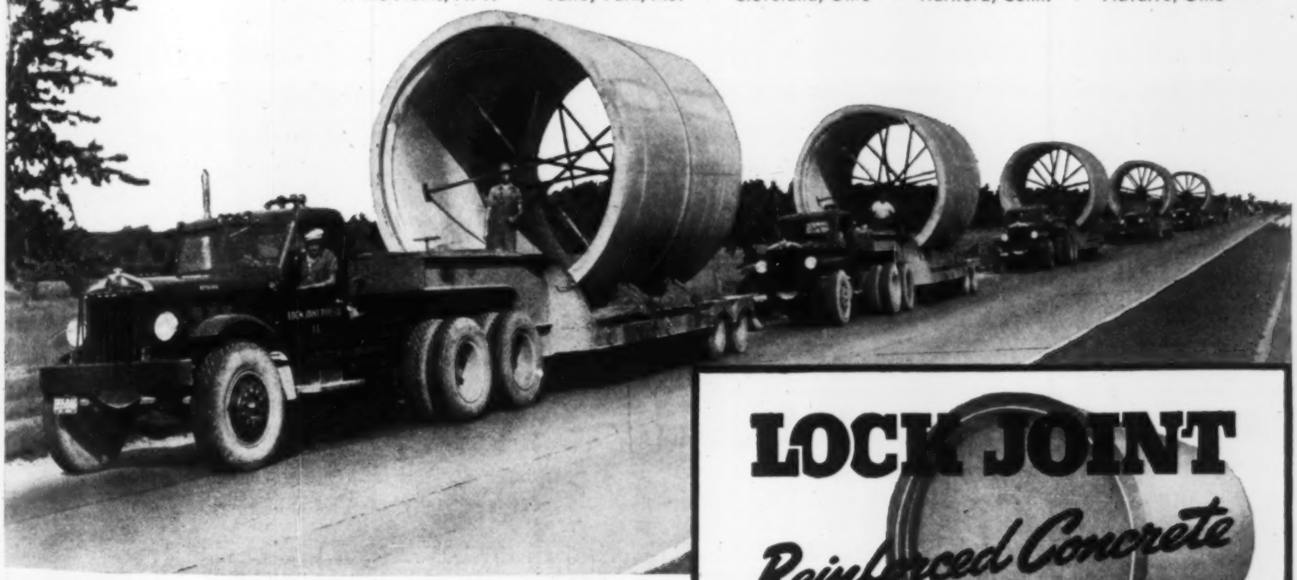
• The shapes and forms that will carve the skyline in 2042 A.D. can only be guessed at. Their design is on the blueprints of the future. Being manufactured and installed today, however, are smooth-flowing pipe lines that will underlie the cities of tomorrow. Lock Joint Pressure Pipe Lines are constructed and laid with an eye to the demands of distant generations. A century of useful service, immune to tuberculation and corrosion, maintaining their original high carrying capacity and original strength! The life expectancy of Lock Joint Reinforced Concrete Pressure Pipe Lines should make them your best investment in 1942. Whether your project is large or small, your 'phone call, telegram, cable or letter to any of our offices, will bring a prompt reply.

LOCK JOINT PIPE COMPANY

Established 1905

AMPERE, NEW JERSEY

Denver, Colo. • Chicago, Ill. • Kenilworth, N. J. • Kansas City, Mo. • Rock Island, Ill.
White Plains, N. Y. • Valley Park, Mo. • Cleveland, Ohio • Hartford, Conn. • Navarre, Ohio



LOCK JOINT
Reinforced Concrete
PRESSURE PIPE

SCOPE OF SERVICES

Lock Joint Pipe Company specialize in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply Mains as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous lines.

above ground, from fire, and from ground shock are considered, and tentative recommendations for precautions in design are given.

Great Britain, Dept. of Scientific and Industrial Research, Road Research Laboratory. Wartime Road Note No. 1, Recommendations for Tar Carpets and Surface Dressings, 11 pp.; Wartime Road Note No. 2, Sources of Naturally-Coloured Chippings in Great Britain, 13 pp.; and Wartime Road Note No. 3, Recommendations for Open-Textured Asphalt Carpets, 8 pp. His Majesty's Stationery Office, London, 1941. Tables, $9\frac{1}{2} \times 6$ in., paper, *6d.* each. (Obtainable from British Library of Information, 30 Rockefeller Plaza, New York, 15 cents each.)

These three pamphlets are intended to assist engineers in dealing with the special problems of road building and maintenance that arise in wartime.

Great Britain, Dept. of Scientific and Industrial Research, Road Research Laboratory. Wartime Road Note No. 4, Salt Treatment for Icy Roads. His Majesty's Stationery Office, London; British Library of Information, 30 Rockefeller Plaza, New York, 1941. 6 pp., tables, $9\frac{1}{2} \times 6$ in., paper, 15 cents.

Recommendations for the treatment of icy roads with salt-sand mixtures under varying conditions are presented. The purpose of this Road Note series is to assist engineers in dealing with special problems under wartime conditions.

(The) Highway Spiral. By G. I. Gibbs. T. D. Toler, Roanoke, Va., 1941. 229 pp., diagrs., charts, tables, $8 \times 4\frac{1}{2}$ in., cloth, \$2.50.

The object of this book is to explain and enlarge upon various formulas, particularly with regard to their practical application to highway alinement. Each of thirteen combinations of tangents, spirals, and circular curves is presented separately in chapter form with examples applying formulas to numerical problems. A large section of useful tables is appended.

Hydraulics, 4 ed. By H. W. King, C. O. Wisler, and J. G. Woodburn. John Wiley & Sons, New York; Chapman & Hall, London, 1941. 303 pp., diagrs., charts, tables, 9×6 in., cloth, \$2.75.

The fundamental principles of hydraulics are presented, including applications in engineering practice, to provide a text for beginning courses and also to serve as a reference book. The material has been revised in accordance with recent trends of research and practice, expanded treatment being given to the subjects of viscosity, manometers, the energy theorem, laminar flow, compound pipes, and non-uniform flow in open channels.

(The) Hydraulics of Steady Flow in Open Channels. By S. M. Woodward and C. J. Posey. John Wiley & Sons, New York; Chapman & Hall, London, 1941. 151 pp., diagrs., charts, tables, $9\frac{1}{2} \times 6$ in., cloth, \$2.75.

The theory of the steady flow of water in open channels is presented in concise form, suitable for use in senior and graduate courses and for home study. Backwater curves and flow-profile analysis under varying conditions receive particular treatment. Certain related topics, such as the moving hydraulic jump and slowly varied flow, are also considered.

Iron Horses, American Locomotives 1829–1900. By E. P. Alexander. W. W. Norton & Co., New York, 1941. 239 pp., illus., diagrs., woodcuts, $11\frac{1}{2} \times 8\frac{1}{2}$ in., cloth, \$5.

This book is a pictorial story of the development of the American locomotive from the first engine to run on rails, in 1829, down to the turn of the century. Following a brief historical résumé of the early years comes a chronological series of prints and lithographs, with case histories, depicting typical locomotives of the years covered by the book. An alphabetical directory of locomotive builders of the United States, past and present, is appended.

Manual of Moment Design. By Jack Singleton. H. M. Ives and Sons, Topeka (Kans.), 1941. 146 pp., illus., tables, diagrs., charts, $10 \times 6\frac{1}{2}$ in., leather, \$4 (apply to the American Institute of Steel Construction, 101 Park Avenue, New York, or to H. M. Ives and Sons).

This volume, which is issued by the American Institute of Steel Construction, provides simple, quick, and exact methods for the solution of bending moments in prismatic, or uniform section, continuous beams and frames. It is intended as a manual for actual use in the preparation of design rather than a textbook.

(The) Nature of Thermodynamics. By P. W. Bridgman. Harvard University Press, Cambridge, Mass.; Humphrey Milford, London, 1941. 229 pp., diagrs., $8\frac{1}{2} \times 5\frac{1}{2}$ in., cloth, \$3.50.

This analysis of thermodynamics is "operational," in that it examines what physicists actually do when they apply the principles of thermodynamics to concrete situations. It centers about a discussion of the two laws of thermodynamics and the corresponding fundamental concepts. Entirely non-mathematical, the book demands an acquaintance with thermodynamics comparable to that of a college student of physics, chemistry, or engineering.

Notes and Problems in Blue Print Reading of Machine Drawings. By D. E. Hobart. Harper & Brothers, New York and London, 1941. 105 pp., diagrs., $11 \times 8\frac{1}{2}$ in., paper, \$1.

The material presented in this book is the outgrowth of the author's experience in teaching the reading of machine drawings to men taking courses in machine-shop practice. The basic principles for reading both detail and assembly drawings are explained, and a large group of sample problem sheets is appended.

Notes on the Design of Harbor Structures. By Fay, Spofford, and Thorndike. Copyright, 1941, by Fay, Spofford, and Thorndike. 136 pp., diagrs., tables, charts, $10\frac{1}{2} \times 8$ in., paper, mimeographed.

This volume, which was prepared for use in a class at Massachusetts Institute of Technology, includes comments on tides; surveys for harbor development; ships and their relation to the design of port structures; dredges and dredging; pile driving; wharves; cargo handling; materials of construction for waterfront work; preservative treatment of timber; and bulkhead walls. There is a bibliography.

Oil Well Drainage. By S. C. Herold. Stanford University Press, Stanford University, California, 1941. 407 pp., illus., diagrs., charts, maps, tables $10\frac{1}{2} \times 7$ in., cloth, \$5.

Events and conditions within a producing reservoir are described, and the influence of well performance on the movement of the oil and gas is presented in simple terms. Analogies between artificial and natural reservoirs are considered, the nature of reservoir energy is discussed, and the function of gas in the production of oil is set forth. The chapters are divided into two parts—for two types of wells with distinct features in drainage. Many citations of field examples are included.

Plant Production Control. By C. A. Koepke. John Wiley & Sons, New York; Chapman & Hall, London, 1941. 509 pp., illus., diagrs., charts, tables, 9×6 in., cloth, \$4.

The maximum production of goods with minimum confusion and expense is the concept dealt with in this book. To this end production control is broken down into its several functions. Each function is treated separately, yet coordinated with the others to show how control of production is obtained for various situations. Review questions and a short bibliography accompany each chapter.

Principles of Sewage Treatment. (National Lime Association Bulletin 212.) By W, Rudolfs. National Lime Association, Washington (D.C.), 1941. 128 pp., illus., diagrs., charts, tables, 9×6 in., paper, 50 cents.

This booklet has been prepared for those who desire information on the subject but lack the time or training for an extended study. The sources and composition of sewage are briefly noted; the microbiology of sewage treatment and sewage stabilization are discussed; methods of treatment, disposal, and analysis are described; and plant operation is covered.

Refuse Collection Practice. Committee on Refuse Collection and Disposal. American Public Works Association, Chicago (1313 East 60th Street), 1941. 659 pp., 221 illus., charts, tables, 9×6 in., cloth, \$5.

This volume constitutes the first comprehensive treatise on the subject published since 1921. The result of two years' research on the part of the Association, it presents an analysis and appraisal of refuse-collection practice based upon information from 190 cities in the United States and Canada. The book also contains detailed tabulations of practices, cost data, as elected bibliography, and a complete index.

Technical Report Writing. (Chemical Engineering Series.) By F. H. Rhodes. McGraw-Hill Book Co., New York and London, 1941. 125 pp., charts, tables, $9\frac{1}{2} \times 6$ in., cloth, \$1.50.

This guide to report writing is based on long experience in teaching the art to engineering students and can be recommended as an excellent one. By confining himself to reports and omitting the material on other technical writing usually found in texts on the subject, the author has been able to cover the subject thoroughly and practically in a small book.

Surveying. By C. B. Breed. John Wiley & Sons, New York; Chapman & Hall, London, 1942. 495 pp., illus., diagrs., charts, tables, $7\frac{1}{2} \times 5$ in., cloth, \$3.

This book has been prepared to meet the demand for short texts, owing to the current tendency to abridge college courses in surveying. It covers the usual field and office practices in land surveys, leveling, and topographic surveys; discusses aerial surveying briefly; and gives the latest practice in public lands surveys. Attention is also paid to the surveying problems that arise in engineering construction.

Table of Natural Logarithms, Vol. 3. Logarithms of the Decimal Numbers from 0.0001 to 5.0000, prepared by the Federal Works Agency, Work Projects Administration for the City of New York, conducted under the sponsorship and for sale by the National Bureau of Standards, Washington, D.C., 1941. 501 pp., tables, 11×8 in., cloth, \$2 (payable in advance).

This present volume, the third in a series of four, contains the values to sixteen decimal places of the natural logarithms of the decimal numbers from 0 to 5 at intervals of 0.0001. Methods for interpolation and inverse interpolation are given.

Textbook of the Materials of Engineering, 6 ed. By H. F. Moore—with a chapter on "Concrete" by H. F. Gonnerman, and a chapter on "The Crystalline Structure of Metals" by J. O. Draffin. McGraw-Hill Book Co., New York and London, 1941. 454 pp., illus., diagrs., charts, tables, maps, $9\frac{1}{2} \times 6$ in., cloth, \$4.

The physical properties of the common materials used in structures and machines, together with descriptions of their manufacture and fabrication, are presented concisely in suitable form for use as a college textbook. The new edition has an added chapter on plastics, and extensive changes and additions have been made throughout the book.

Thermodynamics. By J. H. Keenan. John Wiley & Sons, New York, 1941. 499 pp., diagrs., charts, tables, 9×6 in., cloth, \$4.50.

The object of this book is to give a simple and rigorous exposition of the first and second laws of thermodynamics. Work, temperature, and heat are explicitly defined. The concept of reversibility, entropy, the availability principle, the relations between pressure, volume, and temperature, and states of equilibrium are some of the important subjects discussed. Consideration is also given to engines, cycles, refrigeration, air conditioning, and other thermodynamic applications.

Traffic Engineering Handbook. Edited by H. F. Hammond and L. J. Sorenson; published and distributed by the Institute of Traffic Engineers and the National Conservation Bureau, 60 John St., New York, 1941. 296 pp., illus., diagrs., charts, tables, 9×6 in., cloth, \$3.25.

This authoritative guidebook for engineers engaged in the field of street and highway traffic is the product of fourteen specialists in various phases of the work. Concerned mainly with fundamentals and those portions of the field in which well-accepted principles have been established, its chief purpose is to serve as a day-to-day reference work for those who deal with technical problems of traffic and transportation.

Trains in Transition. By L. Beebe. D. Appleton-Century Co., New York and London, 1941. 210 pp., illus., tables, $11\frac{1}{2} \times 8$ in., cloth, \$5.

The third of Mr. Beebe's books on American railroading offers the same attractive combination of readable text and excellent photographs that its predecessors displayed. In this volume the author is concerned with the changes in practice and equipment that have taken place in recent years, especially the effects of the diesel-electric locomotive, light-weight cars, and air-flow design.

Water Purification for Plant Operators. By G. D. Norcom and K. W. Brown. McGraw-Hill Book Co., New York and London, 1942. 180 pp., illus., diagrs., charts, tables, 9×6 in., cloth, \$2.50.

This is a comprehensive instruction book for filter-plant operators, in which theory and practice are discussed in an elementary way for those without technical education. The structures and equipment used in water purification are described, and operating methods given in full.

(The) Welding Encyclopedia and the Welding Industry Buyers' Manual, 10 ed. Compiled and edited by L. B. Mackenzie and H. S. Card; re-edited by S. Plumley. Welding Engineer Publishing Co., Chicago, Ill. 712 pp., illus., diagrs., charts, tables, 9×6 in., fabrikoid, \$5.

The subject matter of this comprehensive volume is arranged alphabetically, and all relevant illustrations and technical data are to be found directly associated with the definitions and explanations. Some of the principal topics covered are the main types of welding, the most important fields of use, metals and alloys, metal spraying, testing methods, and operator training. Company names are included with a listing of the trade names of their products.

Wire and Wire Gages with Special Section on Wire Ropes. By F. J. Camm. Chemical Publishing Co., Brooklyn, N. Y., 1941. 138 pp., diagrs., tables, 7×4 in., cloth, \$2.50.

Each of the standard wire systems of Europe and America is set forth separately in this manual for greater ease in reference. There is also information on wire drawing and on the construction, use, and maintenance of wire rope.

Wood Technology, Constitution, Properties and Uses. By H. D. Tiemann. Pitman Publishing Corp., New York and Chicago, 1942. 316 pp., illus., diagrs., charts, tables, $9\frac{1}{2} \times 6$ in., cloth, \$3.50.

According to the author, this is the first book in English to give a comprehensive account of our knowledge of wood—its properties and uses. Written by an authority, in a simple and readable style, the book discusses briefly all phases of wood technology and provides references to more detailed discussions of specific subjects. A large number of photographs and microphotographs are included. The book will be of great value to all users of wood.

DIXON'S ELDORADO — HB

Eldorado's Opaque Line is
AN ORIGINAL BLACKOUT

Eldorado's blackouts are always a full success! Each mark, each line is a complete black-eye for that common enemy—MISUNDERSTANDING. When the draughtsman makes his drawing, each inch of it is as he wants it. And it shows up that way on the blueprint! Clear! Distinct! Even! What this means to American production cannot be estimated.

Only Dixon, the makers of Eldorado, are permitted to use the Typhonite process. Through this method, graphite is smashed to minute particles of even size. These make a lead that's smooth, dependable, unerring—the kind you need.

TYPHONITE
ELDORADO

Interesting booklet—*free!*

A little history of pencil-making describes the Typhonite process—it's informative, fascinating. Please write on your professional or business stationery.

PENCIL SALES DEPARTMENT 38-J3 · JOSEPH DIXON CRUCIBLE CO. · JERSEY CITY, N. J.

CURRENT PERIODICAL LITERATURE

Abstracts of Articles on Civil Engineering Subjects from Publications (Except Those of the American Society of Civil Engineers) in this Country and Foreign Lands

Selected items for the current Civil Engineering Group of the Engineering Index Service, 29 West 39th Street, New York, N.Y. Every article indexed is on file in The Engineering Societies Library, one of the leading technical libraries of the world. Some 2,000 technical publications from 40 countries in 20 languages are received by the Library and are read, abstracted, and indexed by trained engineers. With the information given in the items which follow, you may obtain the article from your own file, from your local library, or direct from the publisher. Photoprints will be supplied by this library at the cost of reproduction, 25 cents per page to members of the Founder Societies (30 cents to all others), plus postage, or technical translations of the complete text may be obtained at cost.

BRIDGES

Concrete. Liffey Power Development, W. G. Ebrill and F. G. Clinch. *Civ. Eng.* (London), vol. 36, no. 419, May 1941, pp. 471–474. Three old masonry bridges replaced by reinforced concrete bridges as a result of development of river Liffey involving construction of mass concrete dam in Poulaphouca Gorge which created artificial lake of 5,500 acres; Burgage Bridge described consists of 11 spans of 60 ft each center to center of piers, giving total length of 660 ft between abutment piers; details of design and construction. Before Instn. Civ. Engrs. of Ireland.

Concrete Arch, Niagara Falls. Rainbow Bridge, C. R. Hagey and M. I. Gray. *Roads & Bridges*, vol. 79, no. 9, Sept. 1941, pp. 25–37 and 99–102. Architectural details and notes on construction of Niagara River bridge between United States and Canada; bridge is hingeless arch, 950 ft long with reinforced concrete abutments and approaches totalling 479 ft in length. Design of Main Arch, described by S. Hardesty, and Canadian Plaza, L. E. Shore.

Construction. Standard Bridge Units. *Civ. Eng.* (London), vol. 36, no. 420, June 1941, pp. 494–496. Butterley Company, Ltd., have designed series of standardized members for bridges which will not only service needs of emergency replacement of damaged bridges, but will also permit of assembly and rapid erection of permanent bridges of wide variety of designs; standard bridge comprises five different standard units which suffice for construction of all types of bridge.

Maintenance and Repair. Bridge Records in Mercer County, New Jersey, F. G. Harris and L. R. Schureman. *Pub. Works*, vol. 72, no. 12, Dec. 1941, pp. 11–13. Inadequate, obsolete bridges are being replaced with modern structures as rapidly as available funds will permit; manner in which these structures are being kept in safe working order until they can be replaced, is described.

Piles, Steel. Steel Piles Under Bridges, H. L. Larcombe. *Civ. Eng.* (London), vol. 36, no. 418, Apr. 1941, pp. 437–438. Notes on American experience with bridges supported by steel section piles.

Prefabricated. Norfolk County Council's Emergency Pre-Cast Unit Bridges. F. R. Paynter. *Surveyor*, vol. 100, no. 2582, July 18, 1941, pp. 23–24. Details of design, construction, and assembly of pre-cast ingot iron and timber spans to replace damaged bridges as quickly as possible.

Railroad. B. & O. Pre-Frames and Treats Large Bridge Approach Trestle. *Ry. Eng. & Maintenance*, vol. 37, no. 12, Dec. 1941, pp. 866–868 and 882. Details pertaining to reconstruction of portion of Antietem Creek bridge of Baltimore & Ohio Railroad on Washington County branch; manner in which new timber frame bents were preframed and bored before treatment; nature of old and new construction; procedure in the field.

Railroad, Gangways. Pros and Cons of Service Gangways on Railway Bridges, C. E. Gayes. *Civ. Eng.* (London), vol. 36, no. 418, Apr. 1941, pp. 444–445. With reference to question of necessity of providing "inspection footpath" on large single-track through-span bridges, author puts forward contention that standard design should show service gangways as additional feature to be provided only at option of purchaser. Before Eng. Rev. Bul. of Ry. Board, India.

Reconstruction. Barakar Bridge Reconstruction, R. H. Squire. *Civ. Eng.* (London), vol. 36, no. 420, June 1941, pp. 497–498, 500, and 502. Methods employed by Kumardhubi Engineering Works in reconstructing Barakar Bridge, carrying Grand Trunk Road between Calcutta and Benares across Barakar River; scheme selected required that each of 27 existing main girders should be replaced by new girders of greater load capacity; existing deck was to be maintained; new girders to be on same centers as old main girders; bridge to be available for light traffic during reconstruction. Before Junior Instn. Engrs.

Steel Arch, Niagara Falls. Niagara's Rainbow Bridge, R. G. Skerrett. *Compressed Air Mag.*, vol. 46, no. 11, Nov. 1941, pp. 6584–6586. Notes on bridge described in papers previously indexed from various sources.

Steel, Ontario. Welland River Bridge, L. Loch. *Roads & Bridges*, vol. 79, no. 8, Aug. 1941, pp. 19–22 and 70–71. Welland River bridge is $955^1/_2$ ft long overall, consisting of 18 spans; it carries opposing traffic on separate roadways, each 38 ft wide, bordered by 2-ft reinforced concrete curbs; particulars given of foundation, substructure, superstructure, steel erection, deck slab, and costs.

Steel, Stresses. Influence of Fatigue Strength of Structural Members Upon Design of Steel Bridges, W. M. Wilson. *Am. Ry. Eng. Assn.—Bul.*, vol. 43, no. 426, Sept.-Oct. 1941, pp. 1–19. Fatigue tests described; results; character of fatigue failure; influence of fatigue strength of structural members on design; unit stresses recommended for use in checking against fatigue failure; carbon steel plates and rivets for riveted tension members, silicon and nickel steel plates of riveted tension members, and butt welds in carbon steel plates.

Suspension. Design of Suspension Bridges. *Roads & Bridges*, vol. 79, no. 6, June 1941, pp. 16–19, 72, 74, 76, 78, and 80. Information concerning suspension bridge design as determined from comparison of five longest bridges of this type: Tacoma Narrows, George Washington, Transbay, Golden Gate, and Bronx-Whitestone.

Suspension, Design. Nature, Cause, and Prevention of Resonant Vibration in Suspension Bridges, G. A. Maney. *Western Soc. Engrs.—J.*, vol. 46, no. 2, Apr. 1941, pp. 82–93. Conclusions drawn from failure of Tacoma Narrows Bridge; fundamentals of suspension cable vibration; deduction regarding method of final rupture of Tacoma Bridge based on model studies; conclusions regarding prevention of failure; discussion of aerodynamic action of cable.

Wooden, Connectors. Timber Connectors for Bridge Construction, V. H. McIntyre. *Roads & Bridges*, vol. 79, no. 8, Aug. 1941, pp. 32, 64, and 66. Designs illustrated and uses described for various types of timber connectors, which assure high degree of efficiency to connections in structural timber frames.

BUILDINGS

Grandstands. Stadia: Seating Design, R. Allwork. *Arch. Rec.*, vol. 89, no. 4, Apr. 1941, pp. 99–100. Compilation of specifications for design of grandstands and seats for public stadiums.

Grandstands, Concrete. Concrete as Medium in Grandstand Construction. *Eng. & Contract Rec.*, vol. 54, nos. 8 and 12, Feb. 19, 1941, pp. 12–16 and 22, and Mar. 19, pp. 10–12 and 22. Factors to be considered in design and construction of smaller-sized structures for parks and playgrounds; considerations to be given to expansion and construction joints, concrete, quality and finish.

Maintenance and Repair. Notes on First-Aid Repairs to Damaged Property, C. W. Craske. *Surveyor*, vol. 100, nos. 2584, 2585, and 2586, Aug. 1, 1941, pp. 39–40; Aug. 8, pp. 47–48; and Aug. 15, pp. 57–58. Suggested methods and materials to be used for repair of war-damaged buildings with special data presented on reconstruction of roofs, window repairs, rehanging of doors, and floor and ceiling repairs.

Roof Trusses, Welded Steel. Welded Trussed Purlins, F. J. Samuely. *Engineering*, vol. 152, no. 3952, Oct. 10, 1941, pp. 281–283. It is pointed out that simple welded trusses can compete with joists and other rolled sections even for such short spans as 12 to 15 ft; mainly due to fact that round and flat bars can be used in addition to rolled sections; methods of calculating stresses in girders of this type, which are statically indeterminate; numerous examples of types of welded purlins illustrated and described.

Steel, Design. Steel-Plate Dome Building. *Eng. News-Rec.*, vol. 127, no. 19, Nov. 6, 1941, pp. 646–648. Elliptical welded steel plate dome, resting on vertical steel plate side wall, forms main circular room 80 ft in diameter of new employees' restaurant and recreation building at Chicago Bridge & Iron Company plant in Chicago; low, annular "lean-to," also of steel plate, surrounding main room, heating and air-conditioning plants, kitchen, storerooms, and lounges.

CITY AND REGIONAL PLANNING

Great Britain. Town Planning and Reconstruction, F. A. B. Preston. *Surveyor*, vol. 100, no. 2583, July 25, 1941, pp. 31–32. Forecast of probable post-war building program and preparation of construction dealing with national, regional, and local planning.

Post-War. Suggestions of Post-War Planning, W. Garbutt. *Surveyor*, vol. 100, no. 2595, Oct. 17, 1941, pp. 131–132. Author gives his opinions on necessary considerations in post-war planning including designs of roads and streets, sewage systems, transport and communications, airports, and refuse disposal, all of which have direct bearing on building plan and construction.

Town Control. Town Planning Control of Flat Buildings, J. C. Collings. *Instn. Mun. & County Engrs.—J.*, vol. 68, no. 3, Sept. 16, 1941, pp. 88–96. Restrictions contained in sub-zones referred to are found applicable to Capetown; they may not be suited to other cities, but restrictions can be devised according to principles dealt with to meet particular needs of any given area; paper deals only with erection of new buildings.

CONCRETE

Airport Runways. Concrete Runways at Geiger Field, S. C. Smithwick. *Pac. Bldr. & Engr.*, vol. 47, no. 9, Sept. 1941, pp. 46–48 and 52. Illustrated description of equipment and methods employed in construction of runways at Geiger Field, Spokane, Wash.; contract calls for placing 420,000 sq yd of single-course, 8-6-8-in. concrete pavement in three runways, in parking aprons, and in interconnecting taxiways.

Airport Runways. Place 200,000 Square Yards of Concrete to Extend Yakima Airport. *Concrete*, vol. 49, no. 10, Oct. 1941, pp. 2–3. Plans call for construction of three runways, two of them 4,000 ft long and the other 5,000 ft long, all runways to be 500 ft in width with paved center strip 150 ft wide; rigid type of pavement used.

Ammunition, Storage. How Tertelling Builds Igloos of Concrete at Hermiston, P. Nissen. *Pac. Bldr. & Engr.*, vol. 47, no. 9, Sept. 1941, pp. 40–44. To house munitions for troops stationed in Pacific Northwest, 1,000 white igloos are being built at Umatilla Ordnance Depot in Oregon desert; built of reinforced concrete, igloos are $26^1/_2$ ft wide, 60 to 80 ft long, have arched roof, and are waterproof and lightning proof.

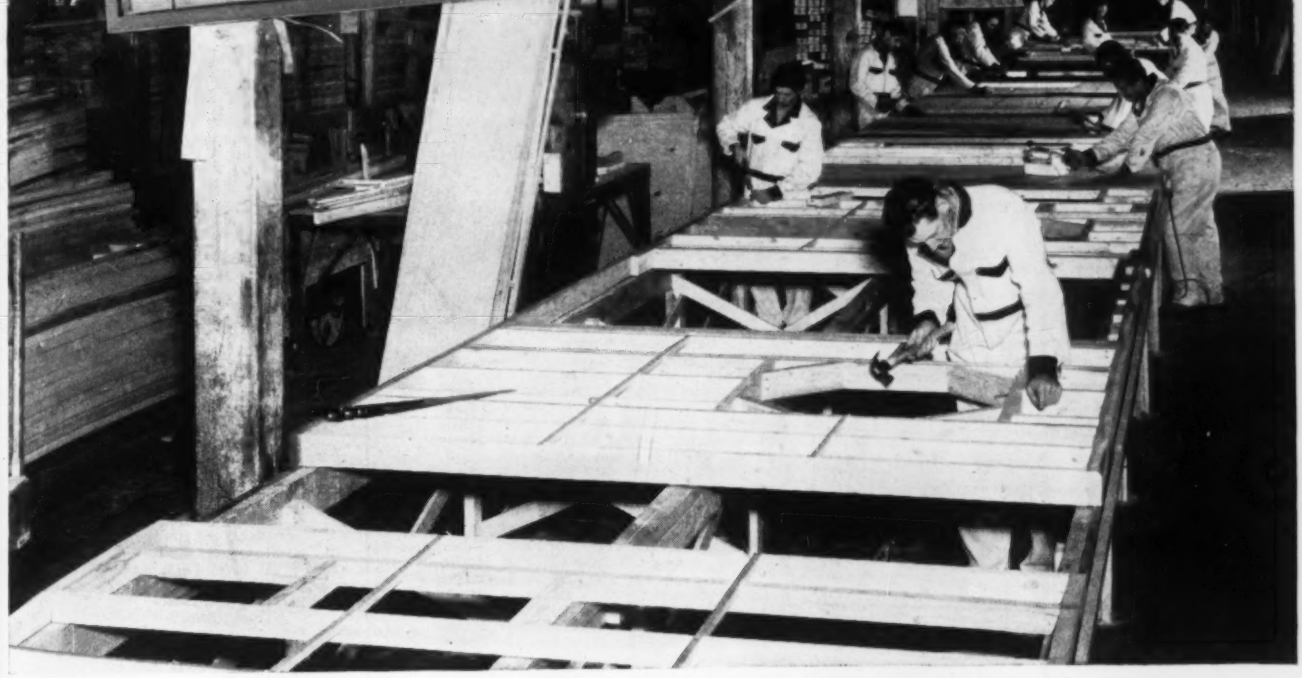
Anti-Aircraft Protection, Shelters. Reinforced Concrete Surface Shelters. *Surveyor*, vol. 100, no. 2590, Sept. 12, 1941, pp. 91–92. Illustrated description of reinforced concrete shelters in London and provincial areas; structure is complete box with walls, floor, and roof tied together as strongly as possible; tests on such design have shown that entire shelter will move as whole in case of very near miss, thus increasing factor of safety.

Construction. Need Industrial Mass Production Methods in Reinforced Concrete Construction, L. Kauf. *Concrete*, vol. 49, no. 10, Oct. 1941, pp. 33–35. Structural form work and lock

HOW TO BUILD HOUSES
FAST

PREFABRICATION WITH PLYWOOD
is the fastest way to build many of today's most vitally needed structures!

This new book gives full details. Send for your FREE copy now!



Every day now engineers and contractors all over the country are undertaking a job new to them: *large-scale housing.* This construction may be barracks for land, sea and air forces, homes and dormitories for war industry workers or other emergency structures. Because this housing is needed in such a hurry, much of it is being prefabricated . . . *for prefabrication has been proved the fastest way to build.*

Here are its advantages:

Prefabrication, for the most part, is shop work which can be systematized. It is much faster than field work, and no time is lost on account of bad weather. This speed minimizes overhead. Greater accuracy and control are obtained. Glued construction, far superior to nailing, is made possible. Foundations are built while walls are assembled. Field erection is accomplished in far less time.

Not only has prefabrication been proved practical, but Douglas Fir Plywood has also been proved the best material for prefabrication. It is now being used as a basic structural material on more than 1000 prefabricated structures a month.

To learn why Plywood is superior for this job and how the nation's leading prefabricators are using it, send at once for the free book *"How to Build Houses Fast."* Douglas Fir Plywood Association, Tacoma Bldg., Tacoma, Washington.

Production-Line Housing results in better shelter, saves time, reduces overhead and provides better working conditions. This has been demonstrated repeatedly by prefabricators from coast to coast. This photograph, taken in the factory of Green's Ready-Built Homes, Rockford, Ill., shows how wall sections, etc., are quickly assembled in jigs from pre-cut materials. This typical prefabricator uses Douglas Fir Plywood for wall and roof sheathing, sub-flooring, interior walls and ceilings. Some Exterior-type Plywood is also used for exterior finish.

DOUGLAS FIR PLYWOOD
Real Lumber
MADE LARGER, LIGHTER
SPLIT-PROOF
STRONGER

SPECIFY DOUGLAS FIR PLYWOOD BY THESE "GRADE TRADE-MARKS"

GENUINE DOUGLAS FIR PLYFORM Concrete Form Panel D.F.P.A. INSPECTED

GENUINE PLYWALL Douglas Fir Plywood WALLBOARD D.F.P.A. INSPECTED

PLYPANEL D.F.P.A.

EXT.-D.F.P.A.

GENUINE PLYSCORD SHEATHING D.F.P.A. INSPECTED

joining of beams as points of departure for new technique in building construction considered.

Construction, Cold Weather. Cutting Down Extra Cost of Concreting in Cold Weather. *Concrete*, vol. 49, no. 11, Nov. 1941, pp. 22 and 28. Use of warm concrete from ready-mixed plant and intelligent use of rapid-hardening cement and calcium chloride suggested.

Construction, Cold Weather. Points to Be Watched When Concreting During Cold Weather. *Concrete*, vol. 49, no. 10, Oct. 1941, pp. 14 and 16. One of most essential of basic points is prompt protection of freshly placed concrete. Such concrete must be kept warm and moist for a sufficient period of time to permit it to go through hardening process with same rapidity as during warm weather.

Construction, Forms. Absorptive Lining at Friant, D. S. Walter. *Western Construction News*, vol. 16, no. 10, Oct. 1941, pp. 298–301. Use of absorptive lining for concrete forms on large scale has proved to be entirely feasible, and additional costs involved have been more than offset by superior quality and appearance of resulting concrete surfaces.

Disintegration. Deterioration of Concrete, J. B. Ley. *Commonwealth Engr.*, vol. 29, no. 2, Sept. 1, 1941, pp. 43–48. Review of current literature describing manner in which concrete is disintegrated and some methods by which destructive effects may be minimized. Bibliography Before Instn. Engrs., Australia.

Mixing. Principle of Dispersion Applied to Portland Cement. *Eng. & Contract Rec.*, vol. 54, no. 12, Mar. 19, 1941, pp. 14–18 and 24. Outline of method of accomplishing reduction of excess water in concrete mixes. Bibliography.

Mixing. Proportioning of Concrete with Special Reference to Grading of Aggregates. K. E. Andrews. *Instn. Engrs. Australia—J.*, vol. 13, no. 8, Aug. 1941, pp. 181–189. Various methods which have been proposed, from time to time, for proportioning of concrete to obtain any desired strength or workability are described; special reference is made to grading of aggregates according to certain so-called "ideal" grading curves and limitations of these methods discussed; application of certain of methods of proportioning to aggregates available locally. Bibliography.

Reinforcement. Construction Design Chart—LXX, J. R. Griffith. *Western Construction News*, vol. 16, no. 10, Oct. 1941, p. 305. Chart presented to aid in computing reinforcement requirements for concrete columns.

Reinforcement, Glass. Experimental Studies of New Reinforcing Medium for Concrete. *Eng. & Contract Rec.*, vol. 54, no. 8, Feb. 19, 1941, pp. 17–20. Report of test results and possible uses of glass plates to replace steel as concrete reinforcement.

Sewers, Lining. Notes on Reconditioning of Existing Sewers at Reigate and Redhill, Surrey, H. P. Kaufman. *Civ. Eng.* (London), vol. 36, no. 423, Sept. 1941, pp 556–559. Reconditioning method consisted of introducing 26-in. diameter steel tubes within existing 4-ft by 2-ft 8-in. truck, and filling annular space between tube and brick face with concrete deposited by means of "Cement Gun" pneumatic-placing machine.

Street Railroad Tracks, Construction. Cement Penetration in Tram Track Construction, J. M. Antill. *Civ. Eng.* (London), vol. 36, no. 418, Apr. 1941, pp. 446–447. Notes on success of application of cement-penetration system for street railroad line construction in Australia; greater economy of construction is provided by utilizing grouting system for manufacture of concrete.

Water Tanks and Towers. Unique Features Mark Design and Erection of Mammoth Concrete Water Tower. *Concrete*, vol. 49, no. 11, Nov. 1941, pp. 2–4. Details of design and construction of reinforced concrete water tank having capacity of 1,000,000 gal, recently completed at Fort Bragg, N.C.; tank was designed in accordance with William S. Hewett system, in which tension rods around tank are first stressed to working lead of steel, thereby compressing concrete in wall of tank prior to filling of tank.

DAMS

Concrete. Erfahrungen beim Betonieren im Kraftwerkbau, H. Nipkow. *Schweizerische Bauzeitung*, vol. 117, nos. 12 and 13, Mar. 22, 1941, pp. 125–129 and Mar. 29, pp. 140–142. Experience with concrete construction in hydraulic power plants; method of building unidentified concrete dam and power plant; concrete mixing, transportation, placing, waterproofing, and testing; frost protection; examples of concrete placing in cold weather; cost of frost protection.

Concrete Gravity, California. Friant Dam, H. W. Young. *Compressed Air Mag.*, vol. 46, nos. 10 and 11, Oct. 1941, pp. 6561–6567; and Nov., pp. 6571–6583. Features of one unit of Central Valley Project in California; map indicating relation of Central Valley to entire state; relief map showing relation of Friant Dam to other units; dam will be of straight gravity type, 320 ft high and 3,430 ft long; use of pumicite added to cement, to lessen temperature rise in setting; details of construction work.

Concrete Gravity, Washington. Largest Structure Ever Built by Man. *Elec. West.*, vol. 87 no. 5, Nov. 1941, pp. 30–44. Detailed illustrated description of features of Grand Coulee Dam. Similar description previously indexed from various sources.

Construction, Water Diversion. Les derivations du Rhone pendant la construction du barrage de Genissiat, V. Charrin. *Houille Blanche*, vol. 8, no. 253–254, Jan.-June 1939, pp. 97–99. Diversion of Rhone River during construction of Genissiat Dam; reference to laboratory studies and model experiments made on flow of water by J. Aubert and application of results to study of flood water discharge and construction of Genissiat diversion tunnels, illustrations of which are given.

Cutoff Walls. Stopping River Under Dam. *Eng. News-Rec.*, vol. 127, no. 19, Nov. 6, 1941, pp. 654–657. Description of method adopted to stop flow of 1,700 cu ft per sec now passing under Hales Bar Dam on Tennessee River; method involves calyx drilling of series of vertical overlapping holes, parallel and as close as possible to upstream face of dam; holes are filled with concrete in cement asbestos pipe and form cutoff wall extending from 25 to 103 ft below river bottom.

Earth, Washington. Building Mill Creek Dam, W. A. Averill. *Pac. Bldr. & Engr.*, vol. 47, no. 8, Aug. 1941, pp. 32–38. Description of methods being employed in construction of Mill Creek Dam, Walla Walla, Wash.; methods are enabling loess to be used in earth-fill dam for first time in Far West; two caterpillar elevating graders teamed with 10 bottom dump Euclids move 1,000 pay yd. per hour; moisture content is watched closely; dam is 3,200 ft long, has maximum height of 145 ft, maximum width of 800 ft, and will contain 1,771,000 cu yd of compacted fill.

Rock Fill, Washington. Truck Ramps, Driers and Tent. *Western Construction News*, vol. 16, no. 10, Oct. 1941, pp. 289–292. Details of methods employed in building Mud Mountain Dam in western Washington, with special reference to construction and use of 6,700 lin ft of concrete decked timber trestle for truck access to bottom of narrow 230-ft canyon, and provisions for handling earth-fill material including mixing in pit, drying to desired water content, and placing.

Soviet Union. Dnieper Dam and Power Station. *Engineer*, vol. 172, no. 4469, Sept. 5, 1941, pp. 147–148. Brief illustrated description of scheme which comprises dam with locks, and various auxiliary plants and one of world's largest hydroelectric power stations, having designed output of 560,000 kw; concrete dam is of gravity type and curved to radius of 600 m; length is 760 m and maximum height 62 m; power house contains 9 main turbines and one auxiliary turbine; supplied by Newport News Shipbuilding and Drydock Company.

FLOOD CONTROL

Forecasting. Return Period of Flood Flows, E. J. Gumbel. Reprint from *Annals of Mathematical Statistics*, vol. 12, no. 2, June 1941, pp. 163–190. Development and solution of simple formula for computation of return period of floods based on fact that flood discharges are largest values of discharges; flood flows of Rhone and Mississippi rivers represented by formula developed.

Rivers, Improvement. River Control in New Zealand and Victoria, H. G. Strom. *State Rivers and Water Supply Commission.* Melbourne, Australia, H. E. Daw, Govt. Printer, 131 pp., July 1941, illus., diagrs. Main characteristics of rivers of New Zealand and Victoria and general outline of methods of control; work, carried out for flood prevention, bank protection, and river channel improvement.

FLOW OF FLUIDS

Pipes. Hydraulic Piping, R. Tyler. *Product Eng.*, vol. 12, no. 11, Nov. 1941, pp. 602–606. Methods of designing hydraulic system piping to overcome losses in efficiency are described.

FOUNDATIONS

Geology, Kentucky. Pre-Pleistocene Initiation of Deep Solution in Lower Tennessee Valley, R. Rhoades. *Am. J. Sci.*, vol. 239, no. 10, Oct. 1941, pp. 964–970. At Kentucky Dam site, solution zones have been observed from borings drilled in connection with treatment of foundation; one zone of extreme bedrock decomposition extends to 230 ft below Tennessee River; presence of sand, from surface, deep within zone of solution, permits correlation of solution with physiographic history of region, roughly indicating age and duration of solvent processes.

Pile Driving. Driving Resistance of Piles, N. A. Matheson. *Civ. Eng.* (London), vol. 36, no. 422, Aug. 1941, pp. 544–545. Formula is presented for preliminary calculations of resistance of driven piles; examples showing application of formula are presented.

Pile Driving. Some Soil Reactions to Pile-Driving, R. Allin. *Civ. Eng.* (London), vol. 36, no. 423, Sept. 1941, pp. 469–570. Paper considers validity of basic assumptions underlying impact formula, in light of recent observations on soil reactions to pile driving, and indicates type of observation that may yield most informative results.

Piles. Modern Piling Methods, R. Hammond. *Civ. Eng.* (London), vol. 36, no. 421, July 1941, pp. 508–514. Relative merits of precast and cast-in-place piles; review of various types of work and methods employed to carry them out.

Retaining Walls, Design. Crib Wall Model Tests Indicate New Design Assumptions Required, C. U. Prout. *Eng. News-Rec.*, vol. 127, no. 19, Nov. 6, 1941, pp. 667–668. Report of experiments which demonstrate that common practice of designing these structures on combination of retaining wall and bin theory is not applicable.

Soils, Mechanics. Get Acquainted with Your Soils, O. L. Stokstad. *Better Roads*, vol. 11, no. 7, July 1941, pp. 15–17 and 31–32. Recommended soil studies for highway purposes; typical chart shows influence of each soil encountered on various questions of highway design and construction that affect nearly all projects.

HYDRAULIC ENGINEERING

Breakwaters. Experiment Station Hydraulics Bulletin. *U. S. Waterways Experiment Station—Hydraulics Research Center*, vol. 4, no. 1, May 15, 1941, 37 pp. Bulletin presents series of short articles describing model studies on proper location of breakwater structures to protect harbors or parts of harbors against action of waves.

HYDROLOGY AND METEOROLOGY

Earthquakes, California. Santa Barbara Earthquake, E. P. Ulrich. *Bldg. Standards Monthly*, vol. 10, no. 10, Oct. 1941, pp. 22–25. General description of earthquake which occurred June 30, 1941; details of damage, which was estimated at about $150,000; sketch map showing location of principal earthquakes of 1940 is given.

INLAND WATERWAYS

Fishways. Investigation of Fishways, A. M. McLeod and P. Nemenyl. *Univ. Iowa—Studies in Eng.—Bul. 24*, 1939–1940, 72 pp. Report of tests and investigations on problem of developing types of fishways, more effective under conditions in state of Iowa than those now in use.

Shore Protection. Protection Against River Erosion, F. J. Salberg. *Civ. Eng.* (London), vol. 36, no. 418, Apr. 1941, p. 448. Notes on concrete block-work protection against river erosion with special reference to difficulties with which Assam Bengal Railway has had to contend through river erosion where its line runs through valleys of Jating, Daiang, and Mahur rivers. Before Eng. Bul. of Ry. Board of India.

IRRIGATION

Rock Overfall Structures. Gravel-Rock Overfall Structures, T. P. Powell. *Agric. Eng.*, vol. 22, no. 11, Nov. 1941, pp. 348–355. Problem of getting successful system for constructing loose rock overfall structures; method described has been successfully used for irrigation drops on generally sandy soil of Stanfield-Umatilla (Oregon) area; it is economical and requires only intelligent attention to detail, while structures can be built by method in short time.

RECLAMATION AND DRAINAGE

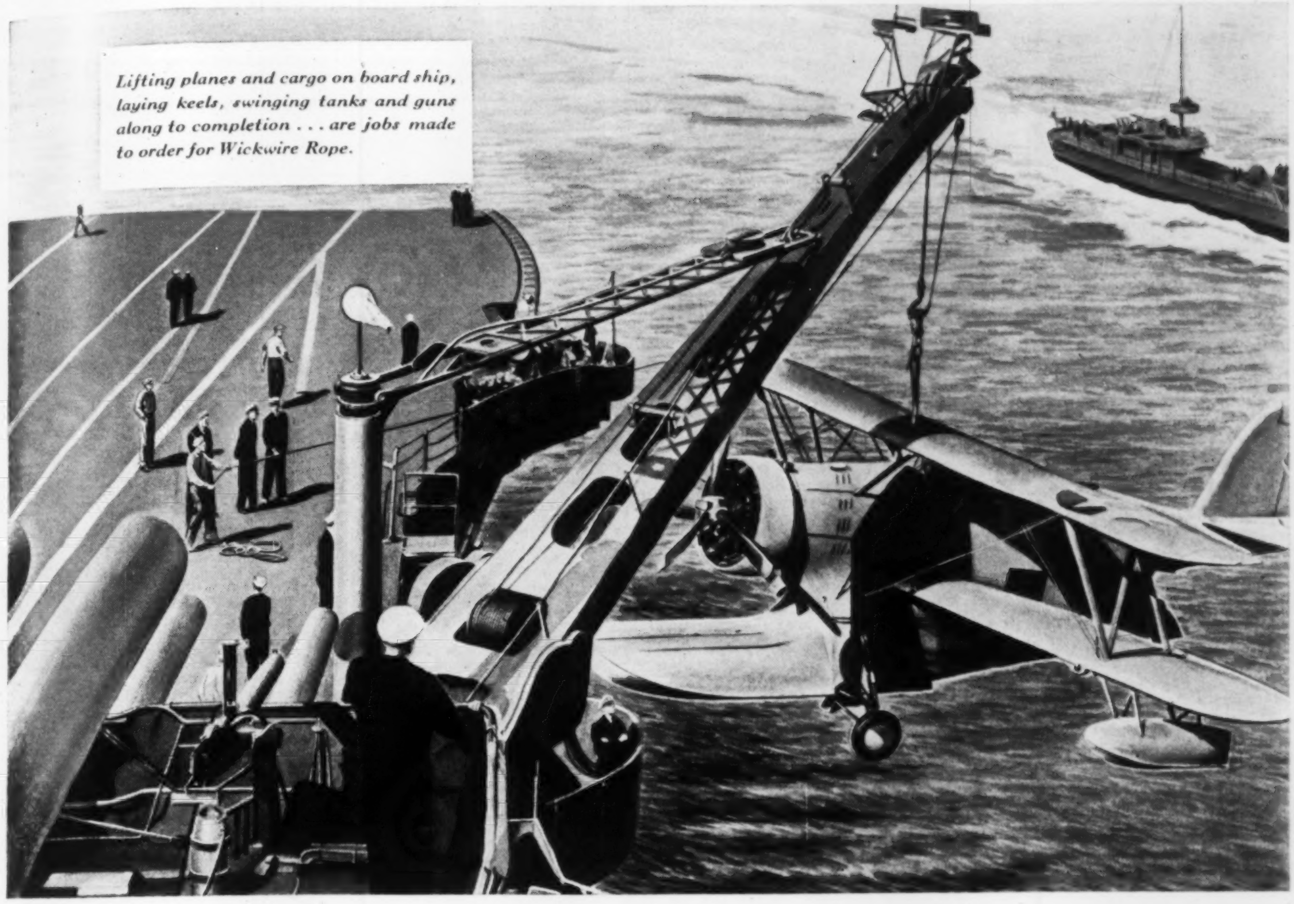
Airports. Considerations in Airport Drainage. *Eng. & Contract Rec.* vol. 54, no. 15, Apr. 9, 1941, pp. 17–20 and 34. Design of pipe lines for removal of surface runoff and principles governing design of ground-water drainage systems.

Airports. Drainage Cannot Be Overstressed in Airport Construction, W. M. Aldous. *Roads & Bridges*, vol. 79, no. 11, Nov. 1941, pp. 24–26, 56, 58, and 60. Author stresses importance of preliminary planning and study of all phases governing airport construction, particularly earthwork, drainage, and paving.

Culverts, Concrete. Building Storm Drain at Albany, Calif., H. I. Dygert. *Pub. Works*, vol. 72, no. 7, July 1941, pp. 26 and 28. Details of construction of concrete culvert, with flat bottom and arched top, 6 ft wide by 6 ft high and 227 ft long, built to prevent erosion along bank of Cordinices creek, which threatened to undermine houses built close to it.

Illinois Coal Lands. Reclaiming Illinois Strip-Mined Coal Lands with Trees, J. P. Schavilje. *J. Forestry*, vol. 39, no. 8, Aug. 1941, pp. 714–719. In Illinois about 100 sq miles of land have been, or will be, stripped in process of mining coal; largely through leadership of Illinois Division of Forestry, mine operators have undertaken program of planting stripped areas; work has been underway for some years and results so far obtained are reported. Bibliography.

Roads and Streets. Outmoded Rural Highways Modernized by Drainage, H. R. Turner. *Pub. Works*, vol. 72, no. 5, May 1941, pp. 26 and 23–29. Study of underdrain requirements in Connecticut; causes of failure of underdrainage: backall and pipe; location of perforations in re-


Lifting planes and cargo on board ship, laying keels, swinging tanks and guns along to completion . . . are jobs made to order for Wickwire Rope.

BRINGING WARBIRDS HOME TO ROOST

Another Job for Wickwire Rope

It takes a lot of "heavy work" to win this war—and where the hoisting, hauling and pulling are toughest, there you'll find Wickwire Rope on the job.

The vital need for this vital steel tool of heavy industry points up a message to all users of Wire Rope.

Make your Wire Rope *last longer* . . . save steel too . . . by taking proper care of Wire Rope on the job.

And when you need Wire Rope, depend on Wickwire regular lay or pre-formed Wissco lay. Let our field men figure your exact needs, and show you how to get the most for the least. Then, after the Wickwire Rope is on the job, our field representative will also consult with you on ways to get most efficient performance.

The uniformity and long-life of Wickwire Rope is assured by our manufacturing methods, which control every step from ore pile, to blast furnace, to open hearth, to finished rope.

• • •

To make wire rope last longer, it's important to consult our authoritative manual "KNOW YOUR ROPES." More than 25,000 users all over the world consider it a bible on the selection, application and handling of wire rope. Write for free copy to: Wickwire Spencer Steel Company, 500 Fifth Ave., New York, N.Y.

THE LOWLY OIL CAN will pay dividends in making wire rope last longer. Internal wear can only be minimized by proper lubrication. Without it, there is excessive friction, binding and grooving which result in premature failure. This and forty more rope life-savers are fully described in our free booklet "Know Your Ropes."

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER

WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

WISSCO PRODUCTS

lation to flow line; experience acquired from installation of $10^{1}/_{2}$ miles of underdrain. In 1940 brought out fact that subsoil formations in State of Connecticut vary widely in character.

Roads and Streets. Surface Drainage and Subdrainage for Highways. *Pub. Works*, vol. 72, no. 9, Sept. 1941, pp. 32, 34, 36, 38, and 41. Purpose of article is to discuss, in general way, roadside drainage and advantages; two general types of drainage system mentioned—one for ditch velocities of under 5 ft per sec and one for velocities of over 5 ft per sec.

MATERIALS TESTING

Concrete, Properties. How Chemicals in Solution May Affect Concrete, C. H. Scholer. *Concrete*, vol. 49, no. 11, Nov. 1941, pp. 33–34. Notes on adverse action of chemicals due to water-carrying corrosive chemicals in solution, or to chemical instability of cement paste or aggregate.

MUNICIPAL ENGINEERING

Beaches. Converting Abandoned Sand Pit into Municipal Swimming Beach, P. Lustig. *Pub. Works*, vol. 72, no. 10, Oct. 1941, pp. 25–26. Nine-acre sandpit at Janesville, Wis., converted into swimming beach and park, at about one-third estimated cost of pool with similar facilities; sandy beach area will accommodate 4,000 persons; beach will be U-shaped, with piers projecting toward center from ends of U; water in pool is that flowing underground to Rock River one-half mile away, water table being about 2 ft above river level; movement toward river suffices to keep water in satisfactory condition.

PORTS AND MARITIME STRUCTURES

British Columbia. Port of New Westminster. *World Ports*, vol. 4, no. 2, Nov. 1941, pp. 17 and 34. Features of port occupying lower 25 miles of main channel of Fraser River, which is land locked harbor having average width of 3,000 ft with low-lying banks adjoining over 90% of its perimeter; waterfront development; facilities; possibilities for expansion.

Dakar, West Africa. Dakar and Other Cape Verde Settlements, D. Whittlesey. *Geographical Rev.*, vol. 31, no. 4, Oct. 1941, pp. 609–638. Historical and descriptive account, with notes on military and naval significance.

Long Beach, Calif. Port of Long Beach. *World Ports*, vol. 4, no. 2, Nov. 1941, pp. 18–19 and 34. Construction program outlined; rearrangement of rail approaches into outer harbor; etc.

Railroads, Alaska. Railways of Alaska. *Ry. Gaz.*, vol. 75, no. 17, Oct. 24, 1941, pp. 408–410. Details pertaining to new railway and port undertakings which will ease and expedite communication with Pacific Coast.

Ship Salvaging. Ship Salvage in Harbours and Docks. *Dock & Harbour Authority*, vol. 21, nos. 250 and 251, Aug. 1941, pp. 206–208, and Sept., pp. 229–231. Development of salvage operations; compressed air as auxiliary; cofferdam in salvage; uprighting of capsized vessels; salvage of steamship "Segovia"; salvage of collier "Isinglass" and of submarine "Thetis"; raising of H.M.S. "Vindictive."

Shipways, Baltimore, Md. Sixteen Shipways Built at Average Rate of One Every Two Weeks. *Construction Methods*, vol. 23, no. 10, Oct. 1941, pp. 42–46, 104, 106–108, 110, 112–114, and 116. Illustrated description of construction of twelve new and rehabilitation of four existing shipways at Bethlehem Fairfield Shipyard; notes on work which required driving 45,000 timber piles, assembling 5 million cu ft of lumber, and placing 45,000 cu yd of concrete.

Shore Protection. Beach Erosion and Coast Protection, J. S. Smith. *Dock & Harbour Authority*, vol. 21, no. 248, June 1941, pp. 165–166, (discussion) 166–167. Beach influence on ports; value of waterfronts; utility of beaches; seaside amenities; beach protection and preservation. Before Am. Assn. Port Authorities.

ROADS AND STREETS

Airport Runways. Brewster Airport, Bucks County, Pa., J. Werk. *Aero Digest*, vol. 39, no. 5, Nov. 1941, pp. 69–70, 72, and 74. Construction features of Brewster airport with special reference to use of soil-cement mixtures for runways.

Airports, Walla Walla, Wash. Efficiency at Walla Walla Airport, W. A. Averill. *Pac. Bldr. & Engr.*, vol. 47, no. 9, Sept. 1941, pp. 58–62 and 64. Project involved grading and draining NE-SW runway 5,100 ft long, 500 ft wide; extending existing N-S runway 800 ft; and building E-W taxiway 2,500 ft long, 125 ft wide. Runways have 9-in. sub-base and 2-in. mat of dense graded plant mixed bituminous macadam, 150 ft wide.

Airports, Washington, D.C. Grading and Paving at U.S. National Airport, *Roads & Bridges*, vol. 79, no. 8, Aug. 1941, pp. 24–25 and 76–81. Design of 720-acre airport and drainage problems presented; total of over 21,000,000 cu yd of earthwork handled in grading; stabilization of sub-base discussed and types of equipment and operations required to stabilize sub-base.

Anti-Aircraft Protection, Great Britain. Rescue Service Incident Control and Clearance and Repair of Highways, F. W. Taylor. *Instn. Mun. & County Engrs.—J.*, vol. 68, no. 1, July 22, 1941, pp. 1–19. Details of control organization to ensure efficient operation of A.R.P. services in event of air raids materializing in Portsmouth, England.

Australia. Darwin Overland Road. *Instn. Engrs. Australia—J.*, vol. 13, no. 7, July 1941, pp. 155–171. Symposium discussing equipment, materials, and methods employed in construction of all-weather road from Tennant Creek to Birdum, distance of 307 miles. Introduction and Description of Project, D. Craig; South Australian Section, J. N. Yeates; Queensland Section, J. R. Kemp; New South Wales Section—General Organization and Arrangement of Work, S. M. Brown; Operation of Plant, G. D. B. Maunder.

Bituminous. Bituminous Construction in Iowa, T. R. Perry. *Better Roads*, vol. 11, no. 12, Dec. 1941, pp. 22–24 and 34. Surfaces of inverted penetration type are placed over four kinds of stabilized bases; bases are soil-aggregate, soil-cement, rolled stone, and soil bitumen; rates of application of bitumen and aggregate quantities for inverted penetration type.

By-Pass. By-pass Highways, C. M. Noble. *Pub. Works*, vol. 72, no. 7, July 1941, pp. 11–12, 32, and 35–37. By-pass highway is still important and necessary element in highway transportation, but it is essential that it be designed along modern principles in order to safeguard investment against early obsolescence and loss in transportation efficiency; designer must differentiate carefully between those conditions to which it is adapted and those where it will serve no useful purpose.

Curves. Elementary Dynamics of Vertical Curves on Highways, W. H. Elgar. *Surveyor*, vol. 100, no. 2593, Oct. 3, 1941, pp. 115–116. Formulas given for design of vertical curves; reference to paper by R. A. Powell indexed in *Engineering Index* 1936, p. 973, which gives results of experiments to determine values for centrifugal acceleration, which author uses as basis for present article.

Design. Standards of Design for Strategic Roads, C. B. McCullough. *Pac. Bldr. & Engr.*, vol. 47, no. 10, Oct. 1941, pp. 48, 52–53, and 74. Principal basic design requirements for strategic roads considered as follows: geometric design and roadway section; roadbed, surfacing, structures; location problems. Before Am. Assn. State Highway Officials.

Expressways and Parkways, New York City. Design and Construction of East River Drive, L. C. Hammond. *Mun. Engrs. J.*, vol. 27, 2d quarterly issue 1941, pp. 56–78, (discussion) 78–82. East River Drive when completed will be double three-lane superhighway 9 miles long, connecting Battery with north end of Manhattan Island at Triborough Bridge; it will cost about $53,000,000; design of viaducts; river piers; expansion joints; retaining walls; viaduct on land piers; esplanade designs; design data; drainage; land acquisition; land areas reclaimed; costs.

Highway Engineering, United States. Programming Highway Construction to Meet Post-Defense Needs, R. B. Brooks. *Eng. News-Rec.*, vol. 127, no. 19, Nov. 6, 1941, pp. 649–651. Principal subjects of address before Am. Assn. State Highway Officials presented in which author discusses plans for work to be undertaken in post-war period to help take up slack in employment created by termination of defense effort.

Highway Systems, Connecticut. Wilbur Cross Parkway Extended. *Eng. News-Rec.*, vol. 127, no. 19, Nov. 6, 1941, pp. 640–643. Particulars of construction work on 9 miles of 22-ft concrete pavement; completed parkway will extend diagonally across state of Connecticut, connecting existing highways; shoulders are being widened to meet military requirements.

Highway Systems, National Defense. Indispensable Quality of Highways to National Defense, T. H. MacDonald. *Am. Highways*, vol. 20, no. 4, Oct. 1941, pp. 9–12. Description of current demands on highway transport and procedures established to deal with problems presented; results of highway planning surveys; access road projects alternate and auxiliary routes for civilian defense; highway maintenance; Highway Traffic Advisory Committee.

Highway Systems, Oregon. Oregon Attacks Sexton Mountain Bottleneck, C. E. Low. *Pac. Bldr. & Engr.*, vol. 47, no. 10, Oct. 1941, pp. 40–41 and 74. Relocation of 78-mile Roseburg-Grants Pass Section of Pacific Highway will save 10 miles in distance, 20,000 deg of central angle; present route has 660 curves as sharp as 76 deg; one cut totals 640,000 cu yd.

Maintenance and Repair. Keeping a Big Equipment Fleet Going, M. N. Brown. *Better Roads*, vol. 11, no. 8, Aug. 1941, pp. 38, 40, 42, and 44. Outline of maintenance equipment and organization in Wayne County, Michigan; county is divided into six maintenance districts, but operation of equipment is more in nature of pool system, in order to secure better coordination and efficiency.

Maintenance and Repair. Streamlining County Highways Lowers Maintenance Costs, J. S. Wagnild. *Pub. Works*, vol. 72, no. 10 Oct. 1941, pp. 24 and 27. Notes on highway construction in Cottonwood County, Minnesota, which reduces snow handling, frost heaves, erosion, and other maintenance costs; specifications call for fills with 3-to-1 slopes, $3^{1}/_{2}$-ft flat bottom ditch $9^{1}/_{2}$ ft wide, and variable backslope.

Pennsylvania. Roadbuilding in Pennsylvania Mountain. *Compressed Air Mag.*, vol 46, no. 11, Nov. 1941, pp. 6587–6588. Illustrations and brief descriptive text, dealing with construction of 3.04-mile stretch of highway to relocate part of Route 115 eastward of Wilkes-Barre, Pa.

Railroad Crossings, Grade Separation. Attractive Structures Feature This Grade Separation. *Ry. Age*, vol. 111, no. 24, Dec. 13, 1941, pp. 995–998. Some aspects of elimination project completed on electrified part of Long Island Railroad, Pennsylvania Railroad subsidiary, at Aqueduct, L. I.

Railroad Crossings, Grade Separation. Railroad Grade Separation at Louisville, Kentucky, J. B. Wilson. *Pub. Works*, vol. 72, no. 10, Oct. 1941, pp. 13–14 and 22. PWA project costing over $2,000,000 by which 10 grade crossings were eliminated; general description of physical structures involved.

Road Materials, Bituminous. Making Use of Local Aggregates for Kansas Bituminous Mats, J. R. Benson. *Better Roads*, vol. 11, no. 9, Sept. 1941, pp. 21–24. Use of specialized gradation specifications, based on laboratory tests, have produced substantial savings in construction costs; composed of mixtures of aggregates and asphaltic materials, bituminous mats produce wearing courses varying from light surfaces less than 1 in. thick, up to heavy surfaces having thickness of 3 or 4 in., or even more.

Road Materials, Bituminous. Results and Experiences with "Low-Cost Roads" Construction Types, F. P. G. Halbfass. *Pub. Works*, vol. 72, no. 7, July 1941, pp. 17–18 and 38–39. Results and conclusions on "type one" surfaces, consisting of bituminous black top on stabilized base; experiences with "type two" surfaces, consisting of stabilized and compacted wearing crust built on well graded and rolled subgrade surface treated with calcium chloride for dust layer; conclusions pertaining to "type two"; results with "type three."

Snow and Ice Control. Methods of Skid-proofing Icy Pavements. *Roads & Bridges*, vol. 79, no. 9, Sept. 1941, pp. 82 and 84. Methods embrace application of treated abrasives or grits to icy surface by either hand or mechanical methods and removal of ice by mechanical means; typical ice control organization discussed.

Snow Removal. Highway, Street, and Airport Snow Removal and Ice Control. *Pub. Works*, vol. 72, no. 10, Oct. 1941, pp. 32, 34–38 and 43–44. Description of equipment and materials available for use by cities, counties, and states for removing light snows or deep drifts, from sidewalks, roads, and airport runways.

Stabilization. Common Sense In Use of Salt, R. A. Rowat. *Eng. & Contract, Rec.*, vol. 54, no. 11, Mar. 12, 1941, pp. 24–25 and 29. Methods of procedure in construction of salt stabilized roads. Benefits of salt stabilization claimed: neither wet nor dry weather will affect road as much as before; road material will not be lost, dust will be cut down, and maintenance expense reduced.

Stabilization. Current Theory Regarding Road Stabilization with Asphalt Emulsions, A. R. Smith. *Roads & Bridges*, vol. 79, no. 6, June 1941, pp. 20–21, 66, and 70. Description of nature of emulsified asphalt and manner in which it is used as stabilizing agent; details of mix adjustment, tests, and test results.

Stabilization. Emulsified Asphalt Stabilized Base Construction, B. T. Collier. *Pub. Works*, vol. 72, no. 11, Nov. 1941, pp. 18–19. In 1939 Coahoma County, Mississippi, constructed 8 miles of road using bituminous stabilized base, which proved so satisfactory that similar projects were constructed this year; methods of constructing road are described.

Stabilization. Stearns County Experiments with Calcium Chloride Stabilization, J. S. Schmit. *Pub. Works*, vol. 72, no. 6, June 1941, pp. 25, 26, and 53. Five miles of gravel roads, stabilized in 1940, are no longer dusty and full of chuck holes; local materials, ordinary county equipment, and simple methods of treatment used.

Subsoils. Studies of Base Course Mixtures, J. B. Garneau and C. E. Beland. *Eng. & Contract. Rec.*, vol. 54, no. 6, Feb. 5, 1941, pp. 15–20. Effect of grading and admixtures on compressive strength and capillary water absorption of soil-base course mixtures.

Testing. Improved Apparatus for Measuring Roughness. *Better Roads*, vol. 11, no. 6, June 1941, pp. 22 and 36. Description of equipment for determining relative roughness of road sur-

REMEMBER
PEARL HARBOR

"Tell me, pretty maiden, are there any more at home like you?"

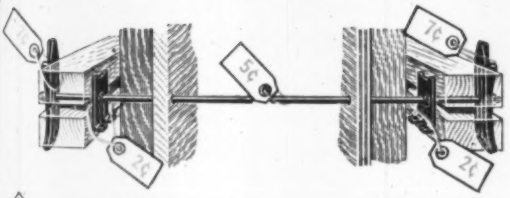
That depends—depends urgently, upon the supply of steel on hand among the makers of these big guns. And, thanks to the ever-growing number of builders and contractors using Richmond's form-tying devices, more steel is being made available for these armaments so vital to our National Victory. Because, as compared, for instance, with "make-shift", "home-made" wire, band or rod ties fabricated on the job—

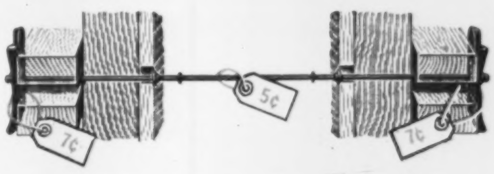
RICHMOND MAKES 1 TON OF STEEL DO THE WORK OF 3 TONS

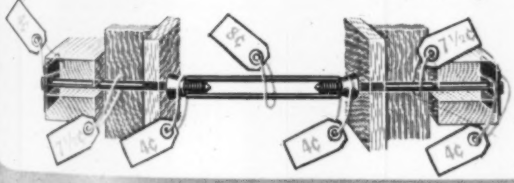
—with specific advantages, that make Richmond form-tying devices and accessories the most economical to use. The "Richmond Way" is the profit-making way, in concrete form work, due to three outstanding features. **First,** a complete line of more than 85 different form-tying devices, specifically engineered for different jobs. **Second,** a free technical and estimating service that saves many hours of weary work by providing completely detailed plans and data especially for your job. **Third,** an immediate and substantial cash saving in not having to buy working parts, such as Tylags, Tycones, Flat Washers, Tywrenches, etc. Richmond loans them to you! Every builder and contractor who, today, turns to Richmond contributes two tons of steel to National Victory for every ton of Richmond's form-tying devices he uses. The job goes faster. The cost is less. The profit is larger. We welcome any opportunity to provide figures that establish these facts.

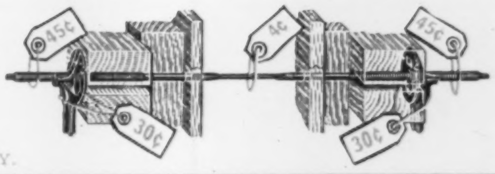
We Sell All Types . . . We Recommend Only Prefabricated Ties . . . They Cost Less!

Figure it for yourself!
HERE ARE THE PRICES*









*BASED ON A 12" CONCRETE WALL

ALL PRICES F. O. B. BROOKLYN, N. Y.

RICHMOND SCREW ANCHOR CO., INC.

816-8 LIBE VE BROOKLYN, N. Y.

faces; schematic drawing of standardized trailer unit and section of elements of improved integrator from which data may be obtained rapidly.

Virginia. Rebuilding Old Roads in Virginia's Primary System, T. F. Loughborough. *Pub. Works*, vol. 72, no. 5, May 1941, p. 32–33. Notes on projects being carried out with reference to rebuilding of existing roads; importance of giving careful consideration to alinement and grades in establishing highway is stressed.

Widening. Widening and Surfacing Thirty Miles of Road, Using Tar and Asphalt Emulsion, J. F. Mollenkopf. *Pub. Works*, vol. 72, no. 9, Sept. 1941, pp. 27 and 51–52. Details of project carried out in Van Wert County, Ohio; it is 14 ft wide for top, with berm about 4 ft wide; roads were all stone macadam pikes, originally built 8 or 10 ft wide; for most part, surfacing was on one side of road and had been well maintained prior to treatment; side ditching, to great extent, was done previously.

SANITARY ENGINEERING

Mosquito Control. Drainage for Mosquito Control. *Pub. Works*, vol. 72, no. 11, Nov. 1941, pp. 21–22. Many cities and other communities are now carrying on mosquito control—especially in vicinity of army and navy camps and posts, or of essential defense establishments; drainage is perhaps most important factor in such control work; essentials in drainage; types of drainage problems; essentials in covered drains.

SEWERAGE AND SEWAGE DISPOSAL

Activated Sludge. Design Factors at Fort Wayne Activated Sludge Plant, C. W. Cole and R. J. Bushee. *Sewage Works Eng. & Mun. Sanitation*, vol. 12, no. 11, Nov. 1941, pp. 592–594 and 597. Description of equipment of plant, completed in November 1940, to handle sanitary sewage of city; designed for population equivalent to 200,000 and average dry-weather flow of 17 mgd.

Airports. Sewage Treatment Plant for Airfield. *Pub. Works*, vol. 72, no. 11, Nov. 1941, p. 17. Brief description of sewage treatment plant for Pendleton Field, Oregon, which consists of primary settling tank, high capacity filter, secondary settling tank, sludge digestion tank, sludge drying beds, control house and office building, and provision for pre- or post-chlorination; plant designed to treat ultimate flow of about 325,000 gal per day.

Biofiltration Process. First Year of Operation of Liberty Biofilter Plant, J. Lawrence and H. Eichenauer. *Pub. Works*, vol. 72, no. 12, Dec. 1941, p. 14–15 and 41. General description of plant; operating data of plant when operated as biofilter, as straight trickling filter, and with recirculation to secondary filter only.

Chemical Warfare, Sewage. Detection of War Gas Poisons in Sewage, R. F. Goudey. *Sewage Works Eng. & Mun. Sanitation*, vol. 12, no. 9, Sept. 1941, pp. 466 and 489. Effects of war gases on sewage; interpretation of present tests, used by Army and sewage treatment plants; additional tests to detect arsenic, mercury, and cyanide.

Disposal Plants, Industrial Waste. Modern Plant Solves Difficult Packing Plant Waste Problem, D. H. Hurst. *Pub. Works*, vol. 72, no. 8, Aug. 1941, pp. 11–12. Details of Tifton, Ga., sewage treatment plant built to treat sanitary sewage and Armour Packing Company waste; design capacity of plant was fixed at 1.25 mgd, this being double present flow of 0.625 mgd, of which 0.325 mgd is sanitary sewage and 0.300 mgd is from Armour packing plant; plant waste is treated in special clarifiers and special trickling filter before being mixed with sewage, and mixture is then clarified and filtered.

Disposal Plants, Jonesboro, Ark. $200,000 Sewage Treatment Plant from Water and Light Profits, E. J. Thomson. *Sewage Works Eng. & Mun. Sanitation*, vol. 12, no. 9, Sept. 1941, pp. 477–479. Two automatic "flush-kleen" lift stations and use of abandoned railroad cut provide solution to difficult problem at Jonesboro, Ark.

Disposal Plants, Marion, Ind. Sewage Sludge Digestion at Marion, Indiana, D. Backmeyer. *Pub. Works*, vol. 72, no. 11, Nov. 1941, pp. 12–14 and 31–32. Notes on Marion sewage treatment plant; results obtained during first 9 months of operation of activated sludge, digestion, vacuum-filtration plant.

Disposal Plants, Military Camps. Sewage Treatment in Army Camps. *Sewage Works Eng. & Mun. Sanitation*, vol. 12, no. 11, Nov. 1941, pp. 606–609. Abstracts from following addresses at Fifteenth Annual Conference of Pennsylvania Sewage Works Assn.: Sewage Treatment Plants in National Defense Program, E. S. Chase and W. A. Hardenbergh; Comparison of Various Types of Secondary Treatment, F. W. Jones; Operating Results at Butler Sewage Treatment Plant, H. I. Kurtz; Operation Results on Sewage Flocculation, A. J. Fischer.

Disposal Plants, Military Camps. Water Supply and Sewage at Army Camps, C. Cohen and W. C. Gauntt. *Pub. Works*, vol. 72, no. 9, Sept. 1941, pp. 23–24 and 48–49. Data on which to base estimates of quantities of water consumption and of sewage to be provided for at Army posts; analysis of data collected from five Army posts.

Disposal Plants, New Richland, Minn. Up-to-Date Sewage Plant for Small Community, A. S. Milinowski. *Pub. Works*, vol. 72, no. 5, May 1941, pp. 14–16. Details of sewage treatment plant designed for estimated population 25 years hence, 90% connected, with reasonable additional capacity for possible ordinary industrial wastes; present population of town is 863; plant has trickling filter and gas-heated digestion tank, housed in brick buildings with tiled interiors.

Disposal Plants, Ontario. Barrie's Sewage Disposal Plant, E. O. Rawson. *Eng. & Contract. Rec.*, vol. 54, no. 7, Feb. 12, 1941, pp. 16–19. Details of disposal plant designed to handle domestic sewage and industrial waste from local tannery; raw sewage pumping equipment consists of 1,200-gpm pump and larger 2,500-gpm pump for stand-by service.

Pumping Plants, Control. Interceptor Velocity Control of Sewage Pumping, C. L. Palmer. *Sewage Works Eng. & Mun. Sanitation*, vol. 12, no. 9, Sept. 1941, pp. 460–463. Fluctuating load, due to storage capacity of large diameter interceptor in Detroit sewage plant, caused failure of parts of plant equipment; in order to overcome them, pumping station operation was altered by means of special charts instructing which pump combination should be used to produce constant interceptor velocity.

Sewage Tanks. Construction and Operation of Single-Stage Digestion Tank, W. F. Snook. *Surveyor*, vol. 100, no. 2595, Oct. 17, 1941, pp. 133–134. Details of excavation and placing of concrete tank 150 × 100 ft giving total capacity, when full, of 186,000 cu ft; operating results tabulated and results of analysis of samples taken between Apr. 1, 1940, and Aug. 1, 1941, are given.

Sewers, Cleaning. Sewer Flushing: Good and Indifferent Practices, J. D. Watson. *Surveyor*, vol. 100, no. 2588, Aug. 29, 1941, pp. 77–78. Article presents facts concerning necessity of flushing sewers depending upon original gradients at which sewers were constructed; gradients also determine velocity of flush water; curves presented show relationships between depth of sewer flush and effects down sewer.

Sewers, Maintenance. Safety Equipment in Sewer Maintenance, E. P. Decher. *Sewage Works Eng. & Mun. Sanitation*, vol. 12, no. 10, Oct. 1941, pp. 523–526 and 575–576. Need for reliable and safe equipment for trained sewer workers; introduction of special detectors facilitate tests for hydrogen sulfide, carbon monoxide, and combustible gas; inhalators and gas masks for poor ventilation; sewer-cleaning equipment.

Sewers, Maintenance and Repair. Repair of War Damage to Sewers. *Surveyor*, vol. 100, no. 2581, July 11, 1941, pp. 17–18. Notes on repair of war damage to sewers, stressing organization of repair gangs and need for making permanent repairs whenever possible; recommendations for survey of extent and nature of damage.

STRUCTURAL ENGINEERING

Airplane Plants, Seattle, Wash. Roof Trusses of 300-Ft Span in Boeing Airplane Plant Addition. *Eng. News-Rec.*, vol. 127, no. 19, Nov. 6, 1941, pp. 652–653. Addition to bomber assembly plant is 1,100 ft long with 300-ft roof trusses about 20-ft apart designed for crane loads of 10 tons; trusses are of Warren type and bottom chords have pin connections to supporting columns; at delivery end of building, 80-ton door swings upwards, supported by end truss, to give clear opening of 35 × 295 ft.

Arches, Design. Hingeless Segmental Arch of Uniform Cross-Section; Some Simplified Formulae, R. J. Cornish. *Instn. Mun. & County Engrs.—J.*, vol. 68, no. 3, Sept. 16, 1941, pp. 76–87. Formulas are derived from strain-energy considerations which give bending moment, horizontal thrust, and shear force at crown of arch in terms of powers of alpha, angle of slope at springings, for various types of dead load; live loads are dealt with by similar formulas, from which influence lines can be drawn; worked example is given.

Beams, Concrete. Designing Reinforced-Concrete Beams with Variable Moments of Inertia, C. A. Ellis. *Eng. News-Rec.*, vol. 127, no. 19, Nov. 6, 1941, pp. 660–663. Determination of angles of rotation of fixed end beams and deriving from them moments necessary for design using principle of area moments when beam is of uniform section; same principle may be used when beam has variable section or moment of inertia by dividing beam into number of units and applying area moments to each; mechanics of this procedure for several types of loading is presented.

Scientific Advance. Science and Technological Advance Applied to Building, R. Fitzmaurice. *Roy. Inst. Brit. Architects—J.*, vol. 48, no. 12, Oct. 1941, pp. 205–206. Directions in which scientific investigations point way to advance in building technology; obstacles to be overcome if full advantage is to be taken of possible advances in building technology.

Slabs, Testing. Notes on Analysis and Design of Rectangular Reinforced Concrete Slabs Supported on Four Sides, S. D. Lash. *Eng. J.*, vol. 24, no. 9, Sept. 1941, pp. 422–430. Mathematical analysis of rectangular plates is considered, and values of bending moments and shearing forces for various conditions of edge restraint are given; analysis is used to determine moment coefficients for reinforced concrete slabs supported on four edges and reinforced in two directions. Bibliography.

Wind Tunnels, Turbulence Measurement. Zur Theorie der Windkanalturbulenz, W. Tollmien and M. Schaefer. *Zeit fuer Angewandte Mathematik u Mechanik*, vol. 21, no. 1, Feb. 1941, pp. 1–17. Theory of wind tunnel turbulence; previous research work; linearizing of hydrodynamical differential equation without usual assumption of isotropy; integration of this equation for boundary conditions shows that flow can be divided into potential flow and diffusion-type flow; mean values of these flows are discussed. Bibliography.

Wind Tunnels. Ueber den Einfluss der Duese (oder des Auffangtrichters) auf Widerstandsmessungen im Freistrahl, D. Kuechemann and F. Vandrey. *Zeit fuer Angewandte Mathematik u Mechanik*, vol. 21, no. 1, Feb. 1941, pp. 17–31. Influence of nozzle on measurements of resistance in force jet; calculation of potential flow in tunnel of circular section, partly bordered by solid walls, partly free jet; with certain assumptions, differential equation for flow can be solved; determination of velocities for correction of measured coefficients and resistance of tunnel.

TRAFFIC CONTROL

Traffic Signs, Signals, and Workings. Uniform Traffic Devices for Highways, J. O. Martineau. *Eng. & Contract. Rec.*, vol. 54, no. 14, Apr. 2, 1941, pp. 10–13 and 20. Illustrations and outline of standard systems of highway traffic marking based on existing American system.

TUNNELS

Construction, Lining. Circular Tunnelling, J. C. Coldham. *Australasian Inst. Min. & Met.—Proc.*, no. 122, June 30, 1941, pp. 63–71. Work described is opening phase of extensive system of underground excavation undertaken under contract with a Malayan authority; location of work is not stated; specifications called for lining of all tunnels in earth or broken rock with circular segmented cast-iron lining, similar to that of London tubes; installation of these linings is discussed; cost data.

Cross Channel. Channel Tunnel, R. Hammond. *Engineer*, vol. 172, no. 4471, Sept. 19, 1941, p. 187. Historical review; it is generally believed that first idea was put forward in 1802 by French mining engineer, Mathieu; discussion of technical side of problem; author is convinced that this great work could be carried out and that if political conditions could be stabilized on the Continent, it would be of inestimable advantage to all.

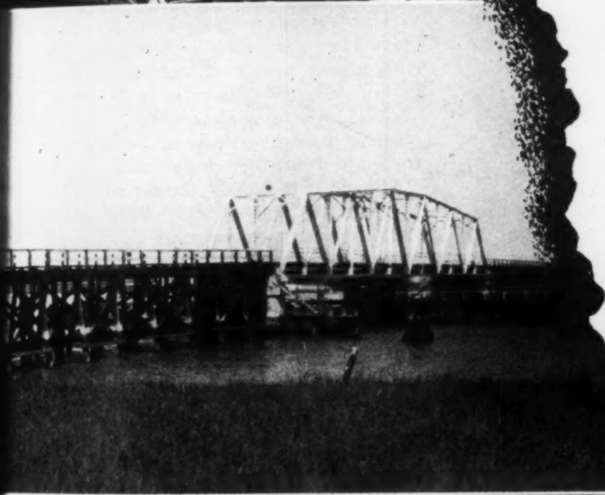
Excavating Machinery. Tunnel Excavation Equipment, R. Hammond. *Civ. Eng.* (London), vol. 36, no. 420, June 1941, pp. 483–486. Illustrated description of several types of machinery for tunnel driving; excavator driven by compressed air; electric excavator modified for tunnel work; rotary excavator; Eimco-Finlay loader; scrape loader.

Mines and Mining. Carlton Tunnel Drains Portland Mine. *Compressed Air Mag.*, vol. 46, no. 11, Nov. 1941, pp. 6589–6590. Notes on completion of connection made with lowest workings of Portland Mine at Cripple Creek, Colo.

Sewers, Construction. Tunnelling 8-Foot Sewer 40 Feet Below Street. *Pub. Works*, vol. 72, no. 5, May 1941, pp. 21–22. Notes on 8-ft relief sewer being built at Terre Haute, Ind., to supplement storm sewer capacities in center of city; sewer will be 5,000 ft long and cost about $1,000,000; considerable part of length is 40 ft or more below street level; maximum depth is 42 ft.

Vehicular, New York. Geology of Lincoln Tunnel, T. W. Fluhr. *Rocks & Minerals*, vol. 16, nos. 117, 118, 119, and 120; Apr. 1941, pp. 115–119; May, pp. 155–160; June, pp. 195–198; and July, pp. 235–239. General features of Lincoln Tunnel, crossing Hudson River between Weehawken, N.J., and West 39th St., New York City; general geologic features; approach section, west of Palisades ridge; Palisade ridge section of New Jersey approach; Weehawken Plaza area; rock tunnels; New Jersey ventilation shaft; under-river section; New York shaft and Plaza.

Ventilation. Vehicular Tunnel Ventilation, F. F. Kravath. *Heating & Vent.*, vol. 38, nos. 10 and 11, Oct. 1941, pp. 52–54 and Nov., pp. 38–42. October: Pressure and exhaust ducts, risers, air filtration and arrangement of fan houses discussed. November: Notes on fan selection and fan drives; atmospheric control and matter of moisture removal from tunnels.



MEMO

For Every Construction Job — foundations, bridges, wharves and other timber projects use —

AMCRECO

Creasoted

PILES and TIMBER

LONG LIFE · ECONOMY · RELIABILITY

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED

AMCRECO LOWRY PROCESS CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY INCORPORATED

ADDRESS INQUIRIES TO CHICAGO, ILL., OR LOUISVILLE, KY.

Equipment, Materials, and Methods

New Developments of Interest, as Reported by Manufacturers

New Form Tie

THE LATEST ADDITION to the varied line of concrete-form tying devices, of the Richmond Screw Anchor Co., Inc., Brooklyn, N.Y., is the Richmond Flex-Ty.

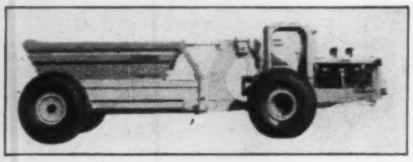
Flex-Ty is designed for use on warped, arc and chord, battered, and multiple battered walls. It has a guaranteed safe working load of 5,000 lb per Ty, without slip or stretch; yet it offers the flexibility of a snake wire, according to the manufacturer's report. The rugged construction of Flex-Ty and its simplicity of installation indicate that it will be a real contribution to faster, better, and easier concrete form work. A four-page folder gives pertinent data and installation details.

Plan Requirements on Government Contracts

CONFIDENTIAL EXPERT ADVICE is offered to government contractors and sub-contractors on a time-saving method of reproducing drawings required under these government contracts. With your request for this information, specifically state whether the contracts you hold are for the Army, Navy, Air Corps, or whatever other government department is involved. All requests for this information must be made on your letterhead and signed by an officer of your Company. Address your inquiries to The Frederick Post Company, Box 803, Chicago, Ill.

Tournapull Hauling Unit

TO FULLY UTILIZE the power and speed of the Super C Tournapull, R. G. LeTourneau, Inc., Peoria, Ill., introduces the W210 Tournatrailer with a heaped capacity of 17 cu yds.



The Tournatrailer is powered by the 150 hp Super C Tournapull with four forward speeds: 2.6, 4.4, 8.1, and 14.3 mph; and reverse of 2.2 mph. The Tournatrailer rides on two 21.00 by 24, 20-ply tires—the same size and ply as on the Super C Tournapull. Other features are: flared side and end walls to give the bowl an 8 ft by 12 ft 8 in. opening at the top; patented, self-cleaning sliding bowl that gives end-dumping or spreading in layers from an inch to 36½ in. in depth; external hydraulic brakes; cable operated from a LeTourneau double-drum power control unit.

De Luxe Chemical Feeder

IN THE BELIEF THAT the current needs of the sanitation field required the best chemical feeder that could be built, Proportioneers, Inc., Providence, R.I., developed their De Luxe Chem-O-Feeder.

%PROPORTIONEERS, INC.%
PROVIDENCE, R.I.

It is a two-part unit—the Chem-O-Feeder, and a detachable Mot-O-Driver base. The Chem-O-Feeder can be bought separately for installations in which the feeder will be belt-driven. Where chemical feed jobs require electric motor drive, the complete unit provides the Chem-O-Feeder mounted on the Mot-O-Drive with its motor under cover.

Despite the many improvements and the distinct advantages of this new unit, the manufacturer reports that prices are surprisingly low.

Rubber Sealing Compound

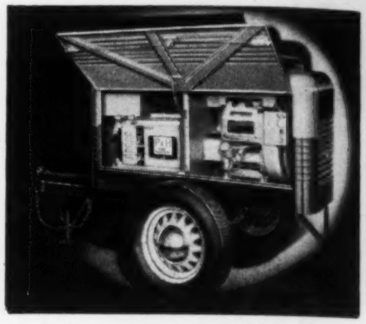
A PRODUCT THAT completely waterproofs any crevice or joining of two sections of concrete slabs is known as Para-Plastic Compound. This composition liquefies readily on heating and can be poured, set and ready within the hour, and is not affected by cold or heat, according to the manufacturer's report.

Its bond with concrete, and perfect seal under all conditions of expansion or contraction, is high because Para-Plastic has been known to extend to ten times its original thickness, the manufacturer states.

Para-Plastic Compound is one of the many products of Servicised Products Corporation, Chicago, Ill.

Engine-Driven Welders

THE HARNISCHFEGER CORP., Milwaukee, Wis., has introduced two new P&H-Hansen gas-driven welder units, Model WN-150 and WN-200, with capacities of 15 to 200 amp and 30 to 60 amp, respectively. Equipped with the latest type P&H-Hansen self-contained welding generators they are powered by a direct-connected heavy-duty 4-cycle, 4-cylinder, V-type Wisconsin gasoline engine. These units are mounted on pneumatic tired trailers with low centers of gravity which permit towing at normal traffic speeds. The wide welding ranges, single current positive power controls and mobility of these units suit them for portable use.

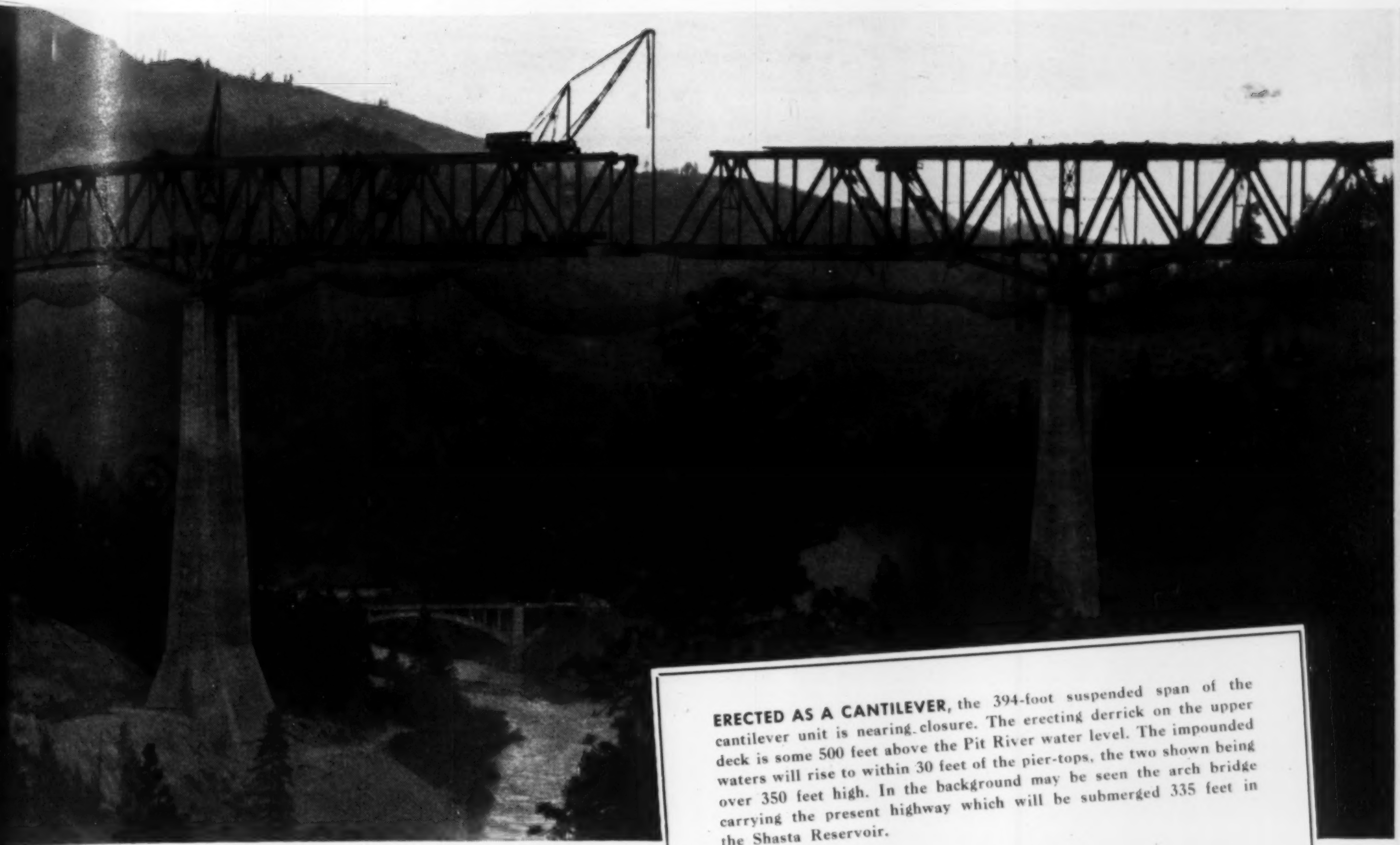


Hinged side panels allow ready access to generator and engine. When desired, the panels may be swung up and locked in place. Recessed compartments, under the canopy, provide ample room for storage of cables, tools, welding rod, etc., while locks on the panels protect the equipment from theft.

Blackout Materials

EFFECTIVE BLACKOUTS of industrial, commercial, and residential buildings require more than the trapping of interior light. According to Philip Carey Mfg. Co., Lockland, Cincinnati, Ohio, blackout materials also should protect: (1) Against the reflection of outside light on windows; and (2) Against flying glass.

To prevent reflected light, as well as to trap interior light, a Carey Blackout Coating, applied as a paint, either inside or outside, is said to be non-reflective and to insure complete light stoppage with one coat. Any one of three types of Carey Blackout Board (laminated asphaltic composition), applied on the inside of windows, is credited with protection against flying glass. Other materials developed by this company are: the Carey Laminated System for weather and shatterproof exterior window blackouts; and the Rejuvo System of Camouflage. Inquiry to Dept. 81 of the company will provide detailed information.



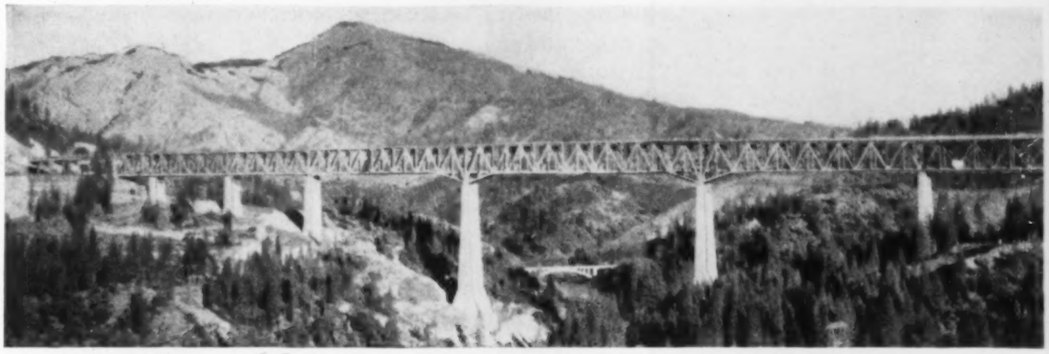
ERECTED AS A CANTILEVER, the 394-foot suspended span of the cantilever unit is nearing closure. The erecting derrick on the upper deck is some 500 feet above the Pit River water level. The impounded waters will rise to within 30 feet of the pier-tops, the two shown being over 350 feet high. In the background may be seen the arch bridge carrying the present highway which will be submerged 335 feet in the Shasta Reservoir.

Highest double-deck bridge in the world!

JUST completed, is the closing link in the railroad and highway relocations around the Shasta Reservoir site, the Pit River Bridge. It is located some 14 miles above Redding, California, where the Southern Pacific main line and U. S. Highway No. 99 converge to a common crossing. It spans the deep river gorge which, eventually, will form an arm of the reservoir. Its upper deck carries the 44-foot roadway and 2½-foot sidewalks of the relocated highway. The lower deck carries the double-track relocated railroad.

A notable feature of this two-third-mile long structure is that the highway deck is some 530 feet above the stream bed. Two of the seven concrete piers exceed a height of 350 feet, the tallest being 358 feet—as tall as a 30-story building. Upon completion of Shasta Dam, the backed-up waters will rise to within 30 feet of the pier-tops—a maximum water depth of 400 feet.

American Bridge participated extensively in the steel requirements of both relocation projects. It constructed, previously, five other bridges: the Salt Creek, the First, Third and Fourth Crossings of the Sacramento, the Antler; and now, the outstanding Pit River Bridge which required the fabrication and the erection of some 17,100 tons of steel. Under contract, also, was the installation of the concrete roadway, railings, drainage systems, and the flooring and tracks of the railroad deck.



THE PIT RIVER BRIDGE, built for the U. S. Government Bureau of Reclamation, is approximately 3470 feet long.

The double-deck, truss structure consists of two 141-foot and three 282-foot simple spans, and a three-span cantilever unit of two 497-foot anchor arms, two 118-foot cantilever arms and a 394-foot suspended span.

Upper-deck highway approaches, on curve with an aggregate length of 714 feet, are deck plate girder spans on steel bents. Girders, ranging from 141 to 154 feet in length, were shipped in one piece, the heaviest weighing 97 tons.

AMERICAN BRIDGE COMPANY

General Offices, Frick Building, Pittsburgh, Pa.

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit · Duluth
Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Export Company, New York

UNITED STATES STEEL

WEST DODD HELPS

KEEP 'EM ROLLING!

—BY STANDING GUARD AGAINST LIGHTNING!

★ On U.S. powder magazines, arsenals, and ammunition loading lines . . . on power stacks and the buildings of many factories where the tools of victory are being forged . . . West Dodd Lightning Protection and static control equipment is doing its bit.

And the reason? Simply a case of playing safe. For records of the National Board of Fire Underwriters' prove that lightning causes a lot of damage . . . is a leading source of fire. Yet there is nothing against which you can be more certain of protection.

West Dodd . . . oldest manufacturer of lightning protection equipment . . . builds systems for all purposes, carrying the approval of the National Board of Fire Underwriters', American Institute of Electrical Engineers, and other competent authorities. West Dodd lightning protection equipment is inspected and labeled in the plant by Underwriters' Laboratories, Inc. Immediate delivery. Write for the details today.

FREE The West Dodd Engineering Dept. will be glad to assist in planning application, or estimating costs.

WEST DODD
LIGHTNING CONDUCTOR CORP.

A RELIABLE PROTECTION AGAINST A LEADING CAUSE OF FIRE

D/S

GOSHEN, INDIANA

Air Raid Shelters

AIR RAIDS IN THIS COUNTRY are no longer considered improbable, particularly in our coastal cities and defense centers. Consequently, the subject of air raid shelters is of current interest.

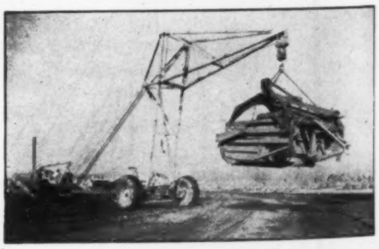
Armco's interest in the subject goes back to 1938 when the Armco International Corporation issued a booklet of suggested designs. Many of these corrugated metal structures have found their way into service in England and her colonial possessions, and more recently in the outlying U.S. air and naval bases.

Next came the construction of many hundreds of Multi Plate "igloos" for sheltering ammunition and other munitions in the various military encampments, bases, ordnance plants and defense establishments. Meanwhile, the Fortifications Section, Chief of Engineers, U.S. Army, made numerous field tests on bomb shelters of various kinds and materials at the Aberdeen Proving Grounds. These have resulted in the designs for Multi Plate Pipe structures now incorporated in the O.C.D. bulletin.

A very limited number of copies of a 34-page, 11 by 17 in. booklet entitled "Armco Air Raid Shelters and Munition Storage Magazines" are available to civilian and military defense authorities and available for inspection by others. An 8-page circular has been produced for general distribution. It describes a 90-in. Multi Plate shelter which will accommodate 50 persons, the maximum recommended by the Office of Civilian Defense. Inquiries should be addressed to the Armco Drainage Products Assn., Middletown, Ohio, or to its various member companies throughout the United States and Canada.

Crane for Army Use

TWO CRANES, the L20 and L40, have been released for distribution to the construction and industrial markets by R. G. LeTourneau, Inc., Peoria, Ill. Developed for handling bulky materials for Army use, these cranes give 20,000 lb lifting capacity a horizontal distance of 20 ft 6 in. out from axle center in upright position, thus enabling the user to get quick and easy handling of bulky, heavy loads.



These cranes, available in 20 and 40 ft boom lengths, are operated from any size tractor or Tournapull with a LeTourneau double-drum power control unit. They offer large crane lifting power with tractor mobility. Rubber tires permit travel over concrete surfaces and give ample flotation for working in soft, mucky conditions. Interchangeable with other LeTourneau equipment on the same unit.

He stood UNDER the ways . . .

with a pencil behind his ear!

Remote from the champagne christening stood a man with a pencil behind his ear.

Suddenly a mighty cheer and the sleek new battle wagon slid down the ways . . . but the man wasn't listening. With trained engineer's eyes he watched every detail of the short journey, making rapid pencil notations and sketches. . . .

Back in the drafting room, many men and many pencils elaborated these sketches into drawings and blueprints . . . . blueprints for mightier ships, for improved ship ways, blueprints for Victory.

Many ships, planes, tanks and guns begin with A. W. Faber WINNER Techno-TONE drawing pencils. Pencils that are backed by 181 years experience. Favored by architects, engineers, artists, designers and draftsmen who gladly pay an extra few pennies for Freedom from Scratching, Smudging, Flaking and Gritty Hard Spots.

17 scientifically graded tones—6B to 9H. Polished rich green. Packed in metal box. For sample of your favorite degree, write Dept. C-3, A. W. FABER, INC., NEWARK, NEW JERSEY.

WINNER *Techno*-TONE

DRAWING PENCILS

13c each 2 for 25c $1.25 dozen

At all Drawing and Artists Material dealers and leading Stationers.

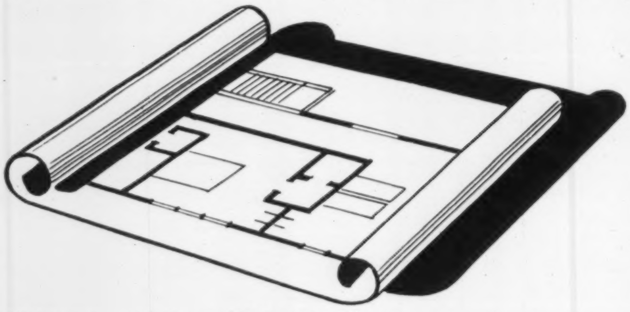
THE HOUSE OF A.W. FABER "CASTELL" STANDARD OF THE WORLD

Companion Pencil — WINNER Thin Colored Checking — Superb colors and strength. Choicest for all prints: 2381 Red; 2382 Blue; 2383 Green; 2385D Yellow; 2437D Orange. 10¢ each. $1.00 dozen. Would you like a sample?

A·W·FABER·*Inc.* NEWARK, N. J.

THIS GUARDS *blueprints*

To provide protection for the thousands of valuable blueprints entrusted in their hands by clients and the Government, the Pioneer Engineering & Manufacturing Company, Detroit, Engineering Consultants, have designed and built into their new building every precautionary measure against the saboteur and spy, as recommended by the Army, the Navy, and the Federal Bureau of Investigation.



THIS GUARDS *drawings*

But steel and concrete can't protect your important drawings from the ravages of time. Tracing cloths that turn brittle and opaque with age destroy thousands of dollars worth of drawings annually. Don't just *hope* this won't happen to you. Specify Arkwright on your next order for tracing cloth, and be *sure!* Sure of a tracing cloth that is clean, transparent, thin yet strong. More important — Arkwright Tracing Cloths *stay* this way. Insist on tracing cloths made by America's oldest manufacturer! Arkwright Finishing Co., Providence, Rhode Island.

Arkwright TRACING CLOTHS

"AMERICA'S OLDEST AND FINEST"

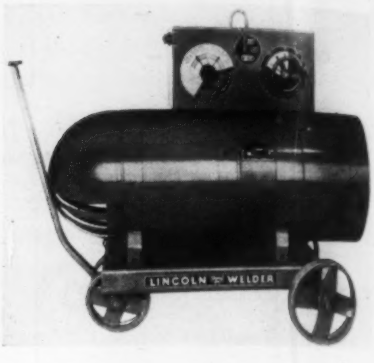
Sold by Leading Drawing Material Dealers Everywhere

Arc Welder Control Eliminates Meter

IMPROVED AND SIMPLIFIED design of its system of "Dual Continuous Control" for arc welding machines, which eliminates the need for volt and ampere meters, is announced by The Lincoln Electric Company, Cleveland, Ohio. These welders have both job selector and current control calibrated and equipped with dials which indicate the type of work and the number of amperes for each and every setting. It is claimed that this feature enables the welding operator to secure highest quality welds and highest possible welding speeds because he can vary both the slope of the volt-ampere curve and the amount of welding current to suit every type of welding job encountered.

Another feature of this welder control is that both voltage control (job selector) and current control are continuous in operation, and, being continuous, the control can be advanced or retarded in increments as fine as desired. It is claimed that this simplifies the setting of the control and accounts for an exceptionally wide welding range as to types of work, welding conditions, sizes of electrodes and thicknesses of material. In addition to simplifying arc welding machine operation, this advance in arc welder design permits a price reduction of $20.00, according to the manufacturer.

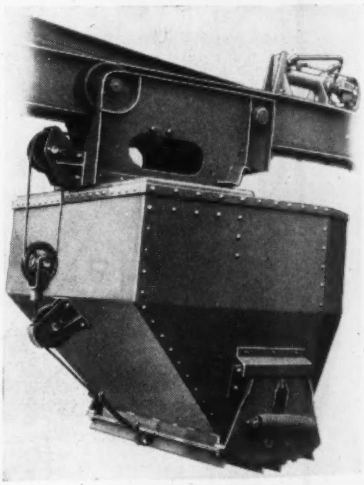
Another important advantage is the ability to positively reverse polarity. The location of the reversing switch has been changed to the position, formerly occupied by the meter, immediately above and between the self-indicating dials. Settings of the reversing switch for "off," "electrode negative" and "electrode positive" are indicated by markings on a disc attached to the control box.



Controlled Boom Bucket

HYDRAULIC CONTROL of its 34-E single and dual drum paver boom buckets has just been announced by the Ransome Concrete Machinery Co., Dunellen, N J.

In road paving, it is often necessary to dump small portions of concrete, here and there, to complete each slab. Heretofore, it was necessary to load the paver bucket with the exact quantity required, making a special trip of the bucket to discharge the required amount. Ransome's new design now permits the bucket doors to be opened or closed to any degree at any position on the boom, permitting the entire drum batch to be loaded into the bucket and any amount of the bucket load to be deposited in any place, within boom reach.



All inside and outside levers, arms, etc., have been eliminated and the boom bucket carriage has no operating parts requiring adjustment or repairs. The bucket doors slide open instead of dropping which provides a clearance from the ground of 23 in. with the doors open and 21 in. when closed—adequate to clear obstructions.

49
48
48
U.S. NAV
41

PERMUTIT* equipment at the JACKSONVILLE NAVAL AIR STATION

Schematic Description. Water supply at the Main Base comes from wells, contains considerable hydrogen sulphide and averages 14 grains hardness per gallon.

Permutit De-gasifiers first remove the hydrogen sulphide, after which all water used at the base is softened to 5 grains per gallon, by two fully automatic Permutit zeolite softening plants, each of one million gallons daily capacity.

The 5-grain water is then softened to zero where required for boilerfeed . . . at each of two power plants by two fully automatic Permutit zeolite softeners. Part of this zero water is diverted to the main laundry.

Two Permutit manual zeolite units soften the water at the power plant serving the hospitals, and a fully automatic zeolite water softener serves the hospital laundry.

The water at four swimming pools is treated by complete Permutit re-circulating equipment, and three other pools under construction are to be similarly equipped.

Permutit is the world's largest manufacturer of water conditioning equipment—makes every type. Why not let Permutit help you solve *your* water problem? Write for free booklets: The Permutit Company, Dept. A14, 330 West 42nd Street, New York, N. Y.

*Trademark Reg. U. S. Pat. Off.

In Canada, call upon the Permutit Company of Canada, Ltd. . . . Montreal . . . Toronto . . . Winnipeg . . . Calgary

PERMUTIT

WATER CONDITIONING HEADQUARTERS

FOUNDATIONS
PRETEST UNDERPINNING
TUBA STEEL CYLINDERS
MASS CONCRETE CONSTRUCTION

SPENCER, WHITE & PRENTIS, INC.
NEW YORK, N. Y.

"COMMERCIAL"
METHODS

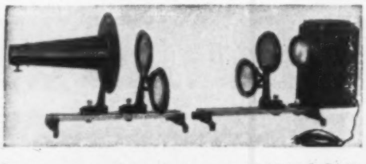
of tunneling—described in our booklet—every engineer interested in tunnel design should have it—Drop us a card.

COMMERCIAL
TUNNEL LINERS

THE COMMERCIAL SHEARING
AND STAMPING CO.
YOUNGSTOWN, OHIO

The LENS
that assures PRECISION

For either qualitative or quantitative photo-elastic analysis, perfection in the projection lens system is of major importance.



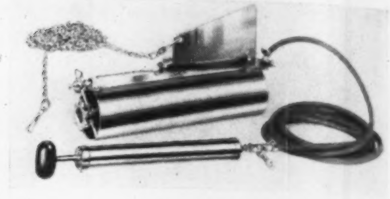
In our new model polariscopes of 4¼″ & 6¼″ clear aperture, the parallel beam is collected by a rear element and condensed through a three component lens of the Cooke system. In the new larger units (8¼″ and 10″ aperture) a four component lens of the Omnar system is used. In both cases, *the image is sharp throughout the field, free of aberration, astigmatism, and distortion.*

Literature of new model polariscope now available.

POLARIZING INSTRUMENT CO.
630 Fifth Ave., New York, N. Y.

Sewage Sludge Sampler

A CONVENIENT DEVICE known as the P.F.T. Sewage and Sludge Sampler for sampling still or flowing liquids without disturbing the liquid bodies or contaminating the samples has been introduced by the Pacific Flush-Tank Company, 4241 Ravenswood Ave., Chicago, Ill.



The unit consists of a metal cylinder with an inflatable rubber valve at each end supported at the axis of the cylinder. On the one side of the unit is a sample withdrawal cock and a vent cock.

The sampler can be used in a vertical position, being passed through the well or hand hole of a digester floating cover or septic tank; or it can be used in horizontal position to take a sample from an Imhoff Tank or flowing stream. Construction is simple and rugged. All parts are accessible for cleaning or replacement. Bulletin No. 133, giving complete details, will be sent on request.

Literature Available

ARC-WELDING—The many advantages of the Lincoln "Shield-Arc," the welder with self-indicating dual continuous control, are described in Bulletin 412. The operation, special features and the economies of this welder are covered for all types of welding. The Lincoln Electric Co., Cleveland, Ohio.

CHLORINE COSTS—The relative costs of available chlorine in hypo form, the methods of buying and sources of supply are given in the report of an exhaustive study recently made by Proportioneers, Inc., 14 Codding St., Providence, R.I.

CLARIFIERS—"Quiescent Clarification" is the title of a booklet which describes small and large diameter Infilco clarifiers, and includes a number of pictures showing actual installations. Mechanical drawings give important details. International Filter Co., 325 W. 25th Place, Chicago, Ill.

CLAY PIPE LOADINGS—A handbook of 54 pages compiles, in three groups of tables, the trench loads on pipe in sizes of 6 in. to 36 in. in soils of four different classifications. Clay Sewer Pipe Association, 947 Oliver Bldg., Pittsburgh, Penna.

EMERGENCY STERILIZATION—The application of Dual Drive Chlor-O-Feeders to emergency chlorination has been thoroughly covered in the recent literature issued by Proportioneers, Inc., 14 Codding St., Providence, R.I.

MOBILCRANE—The truck crane, manufactured by Osgood Co., Marion, Ohio, is powered with a single engine, which controls all lifting and travel motions. A 12-page booklet describes all models.

can you fill these shoes?

There are many pairs of shoes to fill. Throughout industry, technically trained engineers of all kinds are needed to aid America win this war.

All civil engineers are in urgent demand—particularly squad leaders, structural designers and detailers, construction engineers and construction superintendents—men who are available for service at home or abroad.

If you can fill these shoes—if you want to work where you can best do your share in winning this war—register now. Write, placing your record with the nearest office of the Personnel Service, to-day. These are days of action—but the first move must be yours.

engineering societies PERSONNEL service, inc.

CHICAGO
205 W. Wacker Drive

DETROIT
100 Farnsworth Avenue

NEW YORK
29 West 39th Street

SAN FRANCISCO
57 Post Street

WATER FOR A NATION AT WAR!

To the East and to the West, we are looking straight into the cannons of war. From within we face the inevitable saboteur. It is time to become grim, cautious and determined in our war aims and actions. We must win this war and do a good job of it. We will fight with men, metals, fuel, power, food, water and materials of all kinds.

Never before has water been a more vital necessity. Beyond its task of serving men, materials and machines, water now also must guard against fire . . . protect factories, equipment, supplies, homes . . . and lives.

As in the strenuous days of defense preparation, Layne now is ready, fully equipped and speedily engaged in an even greater task . . . that of providing water for a Nation at war. This activity includes service to the Military and Naval forces, essential industries and necessary repair work.

Check your water supply and install necessary wells and pumps. See that all present wells and mechanical equipment are placed in good order and kept ready for any emergency. Repairs to existing equipment will conserve material needed for war purposes.

LAYNE & BOWLER, INC.
Memphis, Tenn.

LAYNE PUMPS & WELL WATER SYSTEMS

Affiliated Companies

Layne-Arkansas Company	Stuttgart, Ark.
Layne-Atlantic Company	Norfolk, Va.
Layne-Central Co.	Memphis, Tenn.
Layne-Northern Company	Mishawaka, Ind.
Layne-Louisiana Company	Lake Charles, La.
Layne-New York Co.	New York City.
Layne-Northwest Company	Milwaukee, Wis.
Layne-Ohio Company	Columbus, Ohio
Layne-Texas Company	Houston, Texas.
Layne-Western Company	Kansas City, Mo.
Layne-Western Co. of Minn.	Minneapolis, Minn.
Layne-Bowler New England Corp.	Boston, Mass.
International Water Supply, Ltd.	London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

Literature Available

PUMPS—Practical information concerning pump adaptation for a wide range of duties under varying conditions is the theme of the new industrial catalog published by Pomona Pump Co., 206 E. Commercial St., Pomona, Calif.

REFLECTING CURB—Why and how white cement reflecting curbs increase safety in night driving is explained in a booklet, "A White Guide to Safety." Other sections cover types and methods of construction of these curbs. Universal Atlas Cement Co., 135 E. 42nd St., New York, N.Y.

SCAFFOLDING—Mechanical Handling Systems, Inc., Detroit, Mich.—8-page illustrated catalog gives complete details of their Safety Steel Scaffolding, and explains the construction that permits easy assembly and dis-assembly.

SHOVEL—Working ranges, lifting capacities, clearance dimensions and other pertinent data are given for the Link-Belt Speeder LS-60 heavy-duty $^1/_2$-yd crawler shovel, dragline, crane, in a new 8-page illustrated book, No. 1929, published by Link-Belt Speeder Corp., 301 West Pershing Road., Chicago, Ill.

SHOVELS—The air control shovels, cranes, draglines and clamshells of Osgood Co., Marion, Ohio, are illustrated, with clear views of major construction details, in a new 12-page booklet.

STEEL SHAPES—A timely booklet catalogs the standard steel shapes manufactured by Commercial Shearing & Stamping Co., Youngtown, Ohio. It includes drawings and all data on those shapes which can be furnished without die or tool charges.

SURVEYING INSTRUMENTS—The forty-ninth edition of the Gurley "Manual of Surveying Instruments" has just been published by W. and L. E. Gurley, Troy, N.Y. This 200-page booklet contains chapters on the care and manipulation of instruments, stadia surveying, nomenclature of instruments, adjustments, astronomy in surveying, and meridian determination, together with 15 tables. It is not a textbook on surveying, but it supplies many useful details supplementing textbooks and of value to the practical surveyor.

This company has also published the "Gurley Ephemeris for 1942." This astronomical almanac contains the solar diagram, terrestrial and celestial coordinates, methods of determining latitude, longitude, meridian, time, and the solar ephemeris for each month of 1942.

TIMBER CONSTRUCTION—What the lumber industries have done and can do in this emergency, for the Army, Navy, for defense housing, for defense industries, and for all industries, is shown in a book entitled, "Behind the Eagle Stand the Forests." In its forty pages, it illustrates and briefly describes many of the jobs done, and the major structural methods involved. Timber Engineering Co., 1337 Connecticut Ave., N.W., Washington, D.C.

We take **RUSH ORDERS** *in our stride!*

This is one of the largest, best equipped Galvanizing plants in the country . . . planned and manned to handle large tonnages. We're *prepared!* . . . for prompt deliveries by boat, truck or any railroad. And, Enterprise workmanship sets a standard for

GOOD GALVANIZING

"SUPPLIERS TO THE U. S. GOVERNMENT FOR OVER 40 YEARS"

ENTERPRISE GALVANIZING CO.

2501 E. CUMBERLAND ST., PHILA., PA.

AMERICAN SOCIETY OF CIVIL ENGINEERS
FOUNDED 1852

Why do so many ENGINEERS ask for all 24 of the ASCE MANUALS?

These Manuals of Engineering Practice, compiled by men of wide experience and acknowledged authority, contain information useful to the civil engineer in his every-day work. They present facts, briefly and to the point, and should be of value to you. You can get the list of Manuals published to date by mailing the coupon.

American Society of Civil Engineers
33 West 39th Street, New York, N.Y.

Please send, without obligation, complete list of 24 Am. Soc. C.E. Manuals.

Name . . . .
Address . . . .
City . . . . State . . . .

BAKELITE

TRADE MARKS

ds "Bakelite" and "Vinylite" and
Units of Union Carbide

the Symbol are registered trade-marks of
and Carbon Corporation

NTHETIC RESINS

the Structure . . .

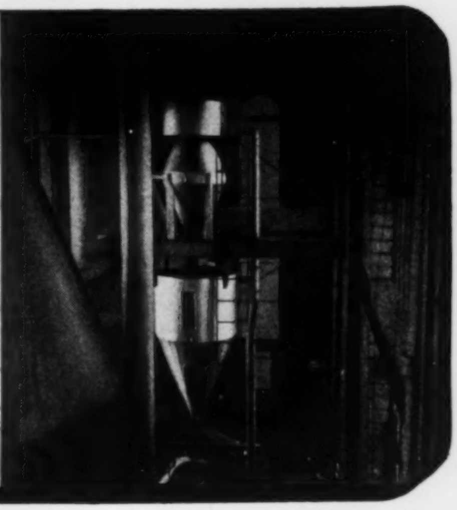
Combating Corrosion in Sewage-Disposal Plants

All metal and concrete surfaces in the large sewage-disposal plant at Fargo, North Dakota, have been protected with special coatings produced from VINYLITE* copolymer resins. These coatings have demonstrated unusual durability, even when submerged in corrosive chemicals. They are highly resistant to abrasion and to the residual alkalinity in the concrete.

*Trade Mark,
Carbide & Carbon Chemicals Corporation

Increased Service Life for Fume-Removal Systems

Despite continued contact with corrosive vapors, fume-removing ducts, fans, and housings show a remarkable increase in service life when coated with baking-type varnishes based on BAKELITE resins. For example, blower wheels thus protected frequently give six times the service of wheels not so coated.



NEW HOME OFFICE

Durable, Fast-Drying Primers for Structural Steel

Construction engineers for the Bankers Life Insurance Company's building in Des Moines, Iowa, specified, for the protection of the structural steel, anti-corrosive primers based on one hundred per cent BAKELITE phenolic resin. These were the advantages gained: fast-drying properties, good hiding power, and exceptional rust-inhibiting qualities.

Maximum Protection Against Weathering

High up in the snowy mountains of Redcliff, Colorado, the new state highway span over Eagle River demands unusually durable surface protection. The bright finishing coats are based one hundred per cent on BAKELITE phenolic resin—a specification which assures maximum protection despite wide extremes of weather, from the severe cold of rigorous winters to excessive summer heat.

Coxe, Simeon Oliver, Jr. (Assoc. M. '42), Associate Structural Engr., TVA (Res., 1709 North Hills Blvd.), Knoxville, Tenn.

Downward, Paul Hollingsworth (Assoc. M. '42), 20 North Linden Ave., Aldan (Delaware County), Pa.

Duffill, Hugh Perrins (Assoc. M. 42), Structural Field Engr., Portland Cement Assn., 10 High St., Boston, Mass.

Ehney, Ward Lisk, Jr. (Jun. '41), Structural Engr., Gieb, La Roche, Dahl, Chappell, Red River Ordnance Depot, Texarkana, Tex.

Erick, William Dea (Jun. '41), Junior Naval Archt., Navy Yard (Res., 622 North Elm Ave.), Portsmouth, Va.

Ernest, Walter Crenshaw, Jr. (Assoc. M. '42), Pres., Ernest Constr. Co., Inc., 174 Louiselle St., Mobile, Ala.

Faulkes, William Frederick, Jr. (Jun. '41), Junior Engr., Inspection, U.S. Engrs., Oscoda, Mich. (Res., 4102 Yuma Drive, Madison, Wis.)

Fillenwarth, Albert Leland (Jun. '41), Civ. Engr., Am. Rolling Mills (Res., 116 South Main St.), Middletown, Ohio.

Foote, Norman C. (Jun. '41), Junior Engr., Humble Oil & Refining Co., Baytown (Res., 413 West Humble St., Goose Creek), Tex.

Fraedrich, Edward Carlile (Jun. '41), Junior Engr., Bethlehem Steel Co., Terminal Island, Los Angeles (Res., 424 Elm Ave., Long Beach), Calif.

Fraenkel, Stefan Josef (Jun. '42), Detailer, Pittsburgh-Des Moines Steel Co., 10th and Tuttle Streets, Des Moines, Iowa.

Galowitch, Werner Fred (Jun. '41), 3827 North Whipple St., Chicago, Ill.

Gay, Robert Leroy (Assoc. M. '42), Asst. Prin. Layout Engr., J. B. Converse & Co., Inc. & A. C. Polk, Box 748 (Res., 829 Quintard), Anniston, Ala.

Gipe, James (Jun. '41), Junior Engr., U.S. Engr. Office, Young Hotel Bldg., Honolulu, Hawaii.

Gould, Clarence Frederick Hilgenhaus (Jun. '41), Junior Engr., U.S. Engr. Office, 201 South 4th St. (Res., 218 North Solano Ave.), Albuquerque, N.Mex.

Greenberg, Bernard Elias (Jun. '41), 115 Massachusetts Ave., Detroit, Mich.

Hansell, William Albert, Jr. (Jun. '42), Associate San. Engr., Utilities Div., Camp Forest, Tullahoma, Tenn.

Hansen, Howard James (Assoc. M. '42), Cons. Engr., Southern Pine Assn.; Instr., Experimental Eng., Tulane Univ. (Res., 1625 Charlton Drive), New Orleans, La.

Howe, Warner (Jun. '41), Eng. Aide, Special Eng. Div., The Panama Canal, Diablo Heights, Canal Zone.

Howell, Herbert Howard (Assoc. M. '42), Dist. Airport Engr., Civ. Aeronautics Administration, 501 Wyandotte Bldg., Columbus, Ohio.

Hunter, William Randolph (Jun. '41), Civ. Engr., Freeport Sulphur Co., Port Sulphur, La.

Itzkowitz, Nathan (Jun. '41), Junior Engr., Walsh-Driscoll Co., Army Post Office 803, El Mamo, Trinidad.

Jamison, Harold Lenard (Jun. '42), Junior Structural Engr., TVA, 400 Arnstein Bldg., Knoxville, Tenn.

Jensen, Carl Fredrick (Jun. '41), Junior Engr., U.S. Bureau of Reclamation, U.S. Customs Bldg. (Res., 2158 South Marion St.), Denver, Colo.

Jones, Charles Albert, Jr. (Jun. '42), 2d Lt., Corps of Engrs., U.S. Army, Company D, 21st Engrs., Langley Field, Va.

Jones, Millard Harrison (Jun. '41), Junior Civ. Engr., Maps and Surveys Div., TVA, Box 59, Newport, Tenn.

Kern, Thomas Francis (M. '42), Lt. Col., Corps of Engrs., U.S. Army, U.S. Engr. Office, 300 Broadway, Little Rock, Ark.

Kjellstrom, Nils David (Jun. '41), 806 Westover Rd., Richmond, Va.

Kocal, Stanley John (Jun. '42), Instr., Civ. Engr., Univ. of Santa Clara, Santa Clara, Calif.

Koski, Leonard (Jun. '41), Draftsman, Boeing Aircraft Co. (Res., 215 Thirteenth Ave.), Seattle, Wash.

Krueger, William Jensen (Jun. '41), Ensign, U.S.N.R., Bureau of Aeronautics, Constitution Ave., Washington, D.C.

Landauer, Leo Levy (Assoc. M. '41), Lt., CEC, U.S.N.R., Headquarters 8th Naval Dist., New Federal Bldg., New Orleans, La.

Ludlow, James Herbert (Assoc. M.' 42), Superv. Engr., Reconstruction Finance Corp., Defense Plant Corp., Washington, D.C. (Res., 201 Brush Creek Blvd., Kansas City, Mo.)

McCabe, William Patrick (Jun. '41), 2d Lt., U.S. Army, Battery E, 85th Coast Artillery (Anti-aircraft), Camp Davis, N.C. (Res., 5518 Hays St., Pittsburgh, Pa.)

McColgin, William Elsworth (Jun. '41), 2d Lt., Quartermaster Corps, U.S. Army, Company A, 85th Quartermaster Battalion, Camp Tyson, Paris, Tenn.

McCormick, Robert Kenneth (Jun. '42), Junior Engr., U.S. Engrs., U.S. Engr. Office (Res., 115 Gandy), Denison, Tex.

McGee, Thomas Vincent, Jr. (Jun. '41), Box 359, Diablo Heights, Canal Zone.

Mauseth, Floyd Elvin (Jun. '42), Junior Engr., U.S. Army Engrs., Central Bldg. (Res., 2103 Twenty-Ninth Ave., South), Seattle, Wash.

Mejia Uruena, Lorenzo (Jun. '41), Civ. Engr., Burns & Roe, Inc., 233 Broadway (Res., 240 West 102d St.), New York, N.Y.

Merrell, John Camp, Jr. (Jun. '42), Junior Hydr. Engr., U.S. Geological Survey, 511 Board of Trade Bldg., Indianapolis, Ind.

Mingledorff, Frank Crum (Jun. '41), Junior Structural Engr., TVA, Fort Loudoun Dam (Res., Hotel General Lenoir), Lenoir City, Tenn.

Muckleroy, Alexander David (Assoc. M. '41), Civ. Engr., Cason Bldg., Nacogdoches, Tex.

Nelson, Sanford Eugene (Jun. '41), 516 North 3d St., Montevideo, Minn.

Nodarse, Aristides Olegario (Jun. '42), Civ. Engr., Companario 264, Havana, Cuba.

Olson, Carl Alexius, Jr. (Jun. '41), 2420 Virginia St., Berkeley, Calif.

Paulette, Robert Griebie (Jun. '42), Draftsman, Wilson & Co., Broadway Arcade Bldg., Pueblo, Colo. (Res., 1522 Mulvane St., Topeka, Kans.)

Peterson, Carl August (M. '42), Civ. Engr., Dept. of Public Works, City of New York, 1800 Municipal Bldg., New York (Res., 5 Southgate Ave., Hastings-on-Hudson), N.Y.

Riedesel, Gerhard A. (Assoc. M. '42), Asst. Prof., Civ. Eng., Univ. of Idaho, Moscow, Idaho.

Roberts, Emory Gilman (Jun. '41), Ensign, U.S.N.R., Naval Air Station, Kaneohe Bay, Honolulu, Hawaii.

Shack, Stephen George (Assoc. M. '42), Structural Engr., Harbison-Walker Refractories Co., Farmers Bank Bldg. (Res., 147 Orchard St.), Pittsburgh, Pa.

Shadel, Francis Henry (Jun. '41), R.F.D. 1, Samuels, Idaho.

Shelton, Mercel Joseph (Assoc. M. '42), (Associated Engrs.), 1935 Goldfield St., San Diego, Calif.

Smith, Hugh Michael (Jun. '41), Junior Engr., U.S. Engrs., Wright Field (Res., 345 Delaware Ave.), Dayton, Ohio.

Smith, Robert Arthur (Jun. '42), Cost Engr., Fraser-Brace Eng. Co., Weldon Spring (Res., 4985 Quincy, St. Louis), Mo.

Taylor, Herndon (M. '42), Gen. Supt., A. Guthrie & Co., Inc., 141 East 4th St., St. Paul, Minn. (Res., 101 Clay St., Burlington, Iowa.)

Trisch, Donald Lee (Jun. '41), Junior Hydr. Engr., U.S. Geological Survey, Box 138 (Res., 9th and Bishop), Rolla, Mo.

Van Ness, Charles Gedney, Jr. (Assoc. M. '42), Designing Engr., Arthur G. McKee Co., 2300 Chester Ave., Cleveland (Res., 12053 Lake Ave., Lakewood), Ohio.

von Colditz, Herbert Ware (Jun. '42), Draftsman, Bethlehem Steel Co., Inc. (Res., 231 Davis Ave., West New Brighton), Staten Island, N.Y.

Vonder Bruegge, Henry John (Jun. '42), Engr., Bemis Brothers Bag Co., 601 South 4th St. (Res., 8500 Watson Rd.), St. Louis, Mo.

West, Raymond Thomas (Assoc. M. '42), Designer, Whitman, Requardt & Smith, Huntsville Arsenal (Res., 713 Ward Ave.), Huntsville, Ala.

White, James Francis (Assoc. M. '42), Archt. Designer, Frederic R. Harris, 27 William St., New York, N.Y. (Res., 115 Halsted St., Apt. 203, East Orange, N.J.)

Williams, Joseph Sanford (Assoc. M. '42), Gen. Supt., Ligon & Ligon, 3310 Ridgewood Ave. (Res., 2309 Roslyn Ave.), Baltimore, Md.

Wittenberg, Frank (M. '42), Associate Civ. Engr., Utilities Div., U.S. Army, Camp Joseph T. Robinson (Res., 2316 Gaines St., Little Rock), Ark.

Wright, John Earl (Jun. '41), Junior Engr., U.S. Engr. Dept., 8th and L Sts., Sacramento (Res., 525 Fairfield Rd., North Sacramento), Calif.

Membership Transfers

Anschuetz, Otto William Julius (Jun. '11; Assoc. M. '20; M. '42), Chf. Engr., Kansas City Bridge Co., 215 Pershing Rd., Room 530, Kansas City, Mo.

Booth, Archibald Allan Kirschner (Jun. '27; Assoc. M. '33; M. '42), Asst. Prof., Civ. Eng., Univ. of Connecticut, Storrs, Conn.

Brown, Marvin Sanger (Jun. '28; Assoc. M. '32; M. '42), Section Head Draftsman, Am. Steel & Wire Co., Rockefeller Bldg., Cleveland (Res., 2286 South Overlook Rd., Cleveland Heights), Ohio.

Buck, Horace Miller (Assoc. M. '33; M. '42), Project Mgr., Mason & Hanger Co., Badger Ordnance Works, Baraboo, Wis.

Comins, Harrison Durgin (Jun. '33; Assoc. M. '42), Asst. Prof., Civ. Eng., Univ. of Missouri, South Eng. Bldg., Columbia, Mo.

Downs, Leonard Vaughn (Jun. '34; Assoc. M. '42), Associate Engr., U.S. Bureau of Reclamation, Coulee Dam, Wash.

Ellwood, Arthur (Jun. '32; Assoc. M. '42), Engr., F. R. Harris, 27 William St. (Res., 361 East 50th St.), New York, N.Y.

Evans, Henry Pritchard, Jr. (Jun. '33; Assoc. M. '41), Associate, Civ. Eng. Dept., 417 Eng. Hall, Univ. of Illinois, Urbana, Ill.

Filby, Ellsworth Lincoln (Assoc. M. '31; M. '42), Prin. Asst. Engr., Black & Veatch, 4706 Broadway, Kansas City, Mo.

Gannon, Donald Arthur (Jun. '37; Assoc. M. '42), Engr., Defense Plant Corp., Balfour Bldg., San Francisco (Res., 855 Peralta Ave., Berkeley), Calif.

Gessner, Edward Heim (Jun. '31; Assoc. M. '34; M. '42), Lt., CEC, U.S.N., Naval Air Station, Alameda, Calif.

Goldbloom, Joseph (Jun. '32; Assoc. M. '42), Asst. Structural Engr., U.S. Engr. Dept., Garden St. (Res., 914 Floyd Ave.), Rome, N.Y.

Hall, William Holland (Assoc. M. '25; M. '42), Dean of Eng., Duke Univ., Drawer A, College Station, Durham, N.C.

Hayden, George Gunderson (Jun. '35; Assoc. M. '42), With Portland Cement Assn., 347 Madison Ave., New York (Res., 16 East Devonia Ave., Mount Vernon), N.Y.

Junior, Francis Edmund (Assoc. M. '36; M. '42), Senior Highway Engr., TVA, Knoxville, Tenn.

Kellogg, Markoe Orcutt (Jun. '37; Assoc. M. '42), Asst. Engr., U.S. Engr. Dept., Care, Dist. Engr., Army Post Office 807, Georgetown, British Guiana.

Koy, Justus John (Jun. '32; Assoc. M. '42), Engr., United Gas Pipe Line Co., Box 1407, Shreveport, La. (Res., 3536 Pineridge St., Houston, Tex.)

Lansford, Wallace Monroe (Jun. '28; Assoc. M. '30; M. '42), Asst. Prof., Theoretical and Applied Mechanics, Talbot Laboratory, Univ. of Illinois, Urbana, Ill.

Portas, Cornelio Estarija (Assoc. M. '26; M. '42), Prin. Designing Engr., Morris Knowles, Inc., 1312 Park Bldg. (Res., 6605 Brainard St.), Pittsburgh, Pa.

Rockefeller, Edward John (Jun. '36; Assoc. M. '42), Asst. Engr., Clarence M. Blair, Inc., 100 Crown St. (Res., 251 Ellsworth Ave.), New Haven, Conn.

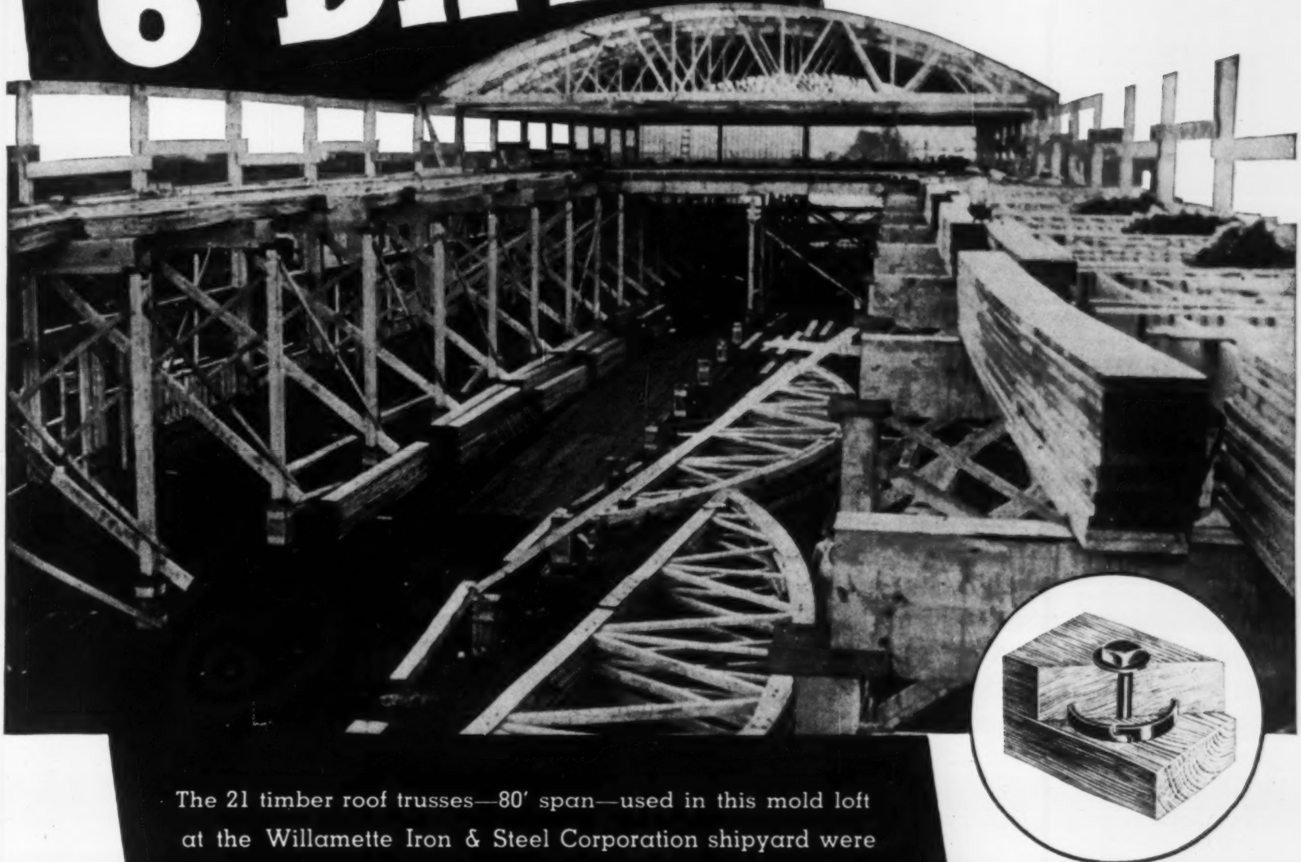
Ruddy, John William (Jun. '35; Assoc. M. '41), Senior Eng. Draftsman, U.S. Engr. Office, Old Post Office Bldg. (Res., 1319 Jackson St.), Vicksburg, Miss.

Santi, Mark Giovacchino (Jun. '37; Assoc. M. '41), Asst. Airways Engr., Civ. Aeronautics Administration, Washington, D.C. (Res., 3917 Bruce St., Alexandria, Va.)

Scott, John Deal (Jun. '33; Assoc. M. '42), 1st Lt., Corps of Engrs., U.S. Army, Care, Area Engr., Blackstone, Va.

Shattuck, Walter Francis, Jr. (Jun. '28; Assoc. M. '39; M. '42), Res. Engr., Sargent & Lundy, 140 South Dearborn St., Chicago, Ill.

DELIVERED IN 6 DAYS



The TECO Ring Connector spreads the load on a timber joint over practically the entire cross-section of the wood.

The 21 timber roof trusses—80′ span—used in this mold loft at the Willamette Iron & Steel Corporation shipyard were framed, assembled and delivered ready-to-erect in 6 working days after final lumber delivery.

Speedy and efficient construction of buildings ranging from small storage sheds to giant mold lofts, like this, is assured through use of the TECO Connector System of Timber Construction and a new engineering service offered to users of wood.

For complete information on how the TECO System can help solve your emergency building problems, fill in and mail the coupon.

Timber Engineering Company, Inc.
DEPT. R-4, 1337 CONNECTICUT AVENUE
WASHINGTON, D. C.

Please send us complete information on the TECO Connector System of Timber Construction.

INDIVIDUAL ....

FIRM ....

STREET .... CITY .... STATE ....

SMITH, JOHN EDWARD (Jun. '38; Assoc. M. '42), Res. Engr., Stone & Webster Eng. Corp., 49 Federal St., Boston (Res., Pleasant St., Marion), Mass.

STEVENS, DUDLEY FIELD (Jun. '35; Assoc. M. '42), Editor, *Western Construction News*, King Publications, 503 Market St., San Francisco, Calif.

THOMAS, MENDALL PATTERSON (Jun. '31; Assoc. M. '42), Junior Hydr. Engr., Water Resources Branch, U.S. Geological Survey, 410 Asylum St., Room 225 (Res., 21 Ashley St., Apt. 201), Hartford, Conn.

TOMLINSON, GEORGE EDMUND (Jun. '27; Assoc. M. '34; M. '42), Senior Engr., TVA, Knoxville, Tenn.

TREWHITT, WAYNE DOUGLAS (Jun. '37; Assoc. M. '42), Supt. and Engr., Easley & Brassy, 74 New Montgomery St., San Francisco (Res., 6016 Chabolyn Terrace, Oakland), Calif.

WALKER, OTIS HAROLD (Jun. '31; Assoc. M. '42), Sales Engr., Missouri Portland Cement Co., 3615 Olive St., Room 1306, St. Louis (Res., 517 McLain Lane, Kirkwood), Mo.

WHEAT, WINSTON EARL (Assoc. M. '25; M. '42), County Engr., Escambia County, County Court House (Res., 1524 East Blount St.), Pensacola, Fla.

WILLIAMS, WALTER BELFORD (Jun. '37; Assoc. M. '41), Res. Engr., State Highway Dept., South Crockett (Res., 121 East College St.), Sherman, Tex.

REINSTATEMENTS

ATWATER, HUNTINGTON CLARK, Assoc. M., reinstated Feb. 26, 1942.

CALLAN, JOHN ALBERT CHARLTON, M., reinstated Feb. 24, 1942.

CARLSTEDT, HARALD, Assoc. M., reinstated Mar. 3, 1942.

GIVOTOVSKY, VICTOR TIMOTHY, Assoc. M., reinstated Feb. 19, 1942.

GRIER, ARTHUR JAY, M., reinstated Mar. 6, 1942.

HOOPER, WILLIAM THOMAS FRANCIS, JR., Jun., reinstated Feb. 18, 1942.

KJERULF, HANS FREDRIK, Assoc. M., reinstated Feb. 9, 1942.

SOLTAU, DAVID LIVINGSTONE, Assoc. M., reinstated Feb. 9, 1942.

RESIGNATIONS

AFRICANO, ALFRED, Assoc. M., resigned Feb. 18, 1942.

BEECHLEY, EDGAR HOMER, M., resigned Feb. 18, 1942.

COMBS, THEODORE CARLOS, Assoc. M., resigned Mar. 5, 1942.

FRIEDMAN, SAM STANLEY, Jun., resigned Feb. 21, 1942.

FULLER, WILLIAM JOHN, M., resigned Feb. 25, 1942.

KINGHORN, ANDERSON MILLS, Jun., resigned Feb. 18, 1942.

KULAS, FRANK EDWARD, Jun., resigned Feb. 25, 1942.

PIERCE, ALTON LOUIS, Assoc. M., resigned Feb, 26, 1942.

POULTER, ALFRED FEAREY, Assoc. M., resigned Feb. 26, 1942.

SMITH, HENRY WILSON, Jun., resigned Feb. 25, 1942.

THOMAS, CHARLES HOWARD, Assoc. M., resigned Feb. 26, 1942.

TOTAL MEMBERSHIP AS OF MARCH 9, 1942

Members	5,754
Associate Members	6,847
Corporate Members	12,601
Honorary Members	37
Juniors	4,896
Affiliates	68
Fellows	1
Total	17,603

Applications for Admission or Transfer

Condensed Records to Facilitate Comment from Members to Board of Direction

April 1, 1942

NUMBER 4

The Constitution provides that the Board of Direction shall elect or reject all applicants for admission or for transfer. In order to determine justly the eligibility of each candidate, the Board must depend largely upon the membership for information.

Every member is urged, therefore, to scan carefully the list of candidates published each month in CIVIL ENGINEERING *and to furnish the Board with data which may aid in determining the eligibility of any applicant.*

It is especially urged that a definite recommendation as to the proper grading be given in each case, inasmuch as the grading must be based upon the opinions of those who know the applicant personally as well as upon the nature and extent of his professional experience. Any facts derogatory to the personal character or professional reputation of an applicant should be promptly communicated to the Board.

Communications relating to applicants are considered strictly confidential.

The Board of Direction will not consider the applications herein contained from residents of North America until the expiration of 30 days, and from non-residents of North America until the expiration of 90 days from the date of this list.

MINIMUM REQUIREMENTS FOR ADMISSION

GRADE	GENERAL REQUIREMENT	AGE	LENGTH OF ACTIVE PRACTICE	RESPONSIBLE CHARGE OF WORK
Member	Qualified to design as well as to direct important work	35 years	12 years	5 years RCM*
Associate Member	Qualified to direct work	27 years	8 years	1 year RCA*
Junior	Qualified for sub-professional work	20 years	4 years	
Affiliate	Qualified by scientific acquirements or practical experience to cooperate with engineers	35 years	12 years	5 years RCM*

* In the following list RCA (responsible charge—Associate Member standard) denotes years of responsible charge of work as principal or subordinate, and RCM (responsible charge—Member standard) denotes years of responsible charge of IMPORTANT work, i. e., work of considerable magnitude or considerable complexity.

APPLYING FOR MEMBER

ADAMS, WALLACE THEODORE, Effingham, Ill. (Age 42) (Claims RCA 12.0 RCM 8.0) April 1940 to date Sales Engr., W. Q. O'Neall Co. of Illinois; previously with Illinois Div. of Highways as Jun. Highway Engr. and Asst. Engr.

ANDREWS, EARLE TOPLEY (Assoc. M.), Mount Union, Pa. (Age 40) (Claims RCA 10.6 RCM 7.2) Nov. 1927 to date with Pennsylvania Glass Sand Co. (Corporation), Lewistown, Pa., as Engr., Chf. Engr., and (since April 1941) Gen. Supt.

ARNOLD, GERALD EUGENE (Assoc. M.), San Francisco, Calif. (Age 40) (Claims RCA 3.9 RCM 10.9) Jan. 1942 to date San. Engr. (R), U.S. Public Health Service, assigned to Office of Civilian Defense; previously Water Purification Engr., and Chf. Water Purification Engr., San Francisco (Calif.) Water Dept.

CARSON, ARTHUR BRINTON, Philadelphia, Pa. (Age 35) (Claims RCA 5.2 RCM 7.2) Aug. 1940 to date Asst. Chf. Engr., Henry W. Horst Co.; July to Aug. 1940 Engr., Constr. Q. M., Fort Dix, N.J.; previously Constr. Engr., Perry Constr. Co.; Superv. Engr., Major Constr. Co.

CORREALE, WILLIAM HERBERT (Assoc. M.), Jackson Heights, N.Y. (Age 41) (Claims RCA 4.1 RCM 8.3) Jan. 1936 to date with Dept. of Water Supply, Gas and Elec., City of New York, as Deputy Commr., and (since May 1941) Deputy and Acting Commr.

DAYETT, GURNEY HENDRICKSON, Baltimore, Md. (Age 55) (Claims RCA 5.8 RCM 9.2) Feb. 1922 to date with Eng. Dept., Baltimore and Ohio R.R., as Bridge Draftsman, Asst. Engr., Chf. Draftsman, Designing Engr., and (since Jan. 1940) Asst. Engr. of Bridges.

ENSZ, HERBERT, Chicago, Ill. (Age 44) (Claims RCA 5.0 RCM 11.0) 1939 to date Head, Testing and Inspection Sec., Dept. of Subways and Superhighway, Chicago, Ill.; 1928 to 1939 with Civ. Eng. Dept., Armour Inst. of Technology, as Instructor, Asst. Prof., and Associate Prof.

ERICKSON, HUGO GUSTAF, Minneapolis, Minn. (Age 39) (Claims RC 8.5 D 8.5) June 1937 to date Paving Engr., City of Minneapolis; previously with Minnesota Dept. of Highways as Inspector, Draftsman, Rodman, Chainman, Instrumentman, Designer, Res. Engr., and Project Engr.

ESTES, MORGAN REID, Oakland, Calif. (Age 35) (Claims RCA 6.1 RCM 7.5) June 1941 to date Asst. Constr. Engr., Bechtel-McCone-Parsons Corporation; Nov. 1940 to June 1941 Asst. Constr. Engr., Rollins & Forrest, Archt.-Engrs., Camp Wolters, Tex.; previously Highway Engr., Loving County, Tex.; Hydr. Engr., Red Bluff Water Power Improvement Dist.; Project Engr., H. B. Zachry Co., San Antonio, Tex.

FAIRBAIRN, EDWIN ALEXANDER (Assoc. M.), Sacramento, Calif. (Age 37) (Claims RCA 3.0 RCM 5.5) Sept. 1933 to date with Sacramento County, 3 years in County Engr.'s Office, and (since Sept. 1936) County Engr.

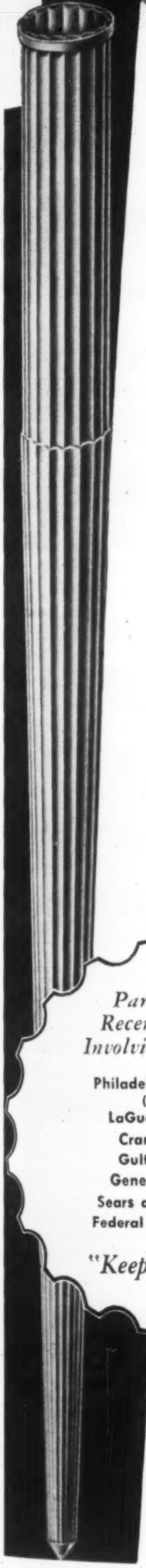
GAMMIE, ROBERT JAMES, Dallas, Tex. (Age 52) (Claims RCA 11.0 RCM 17.4) Oct. 1919 to date with The Texas and Pacific Ry. Co., as Instrumentman, Asst. Roadmaster, Asst. Engr., Gen. Roadmaster, Engr., M. of W., and (since Aug. 1941) Chf. Engr.

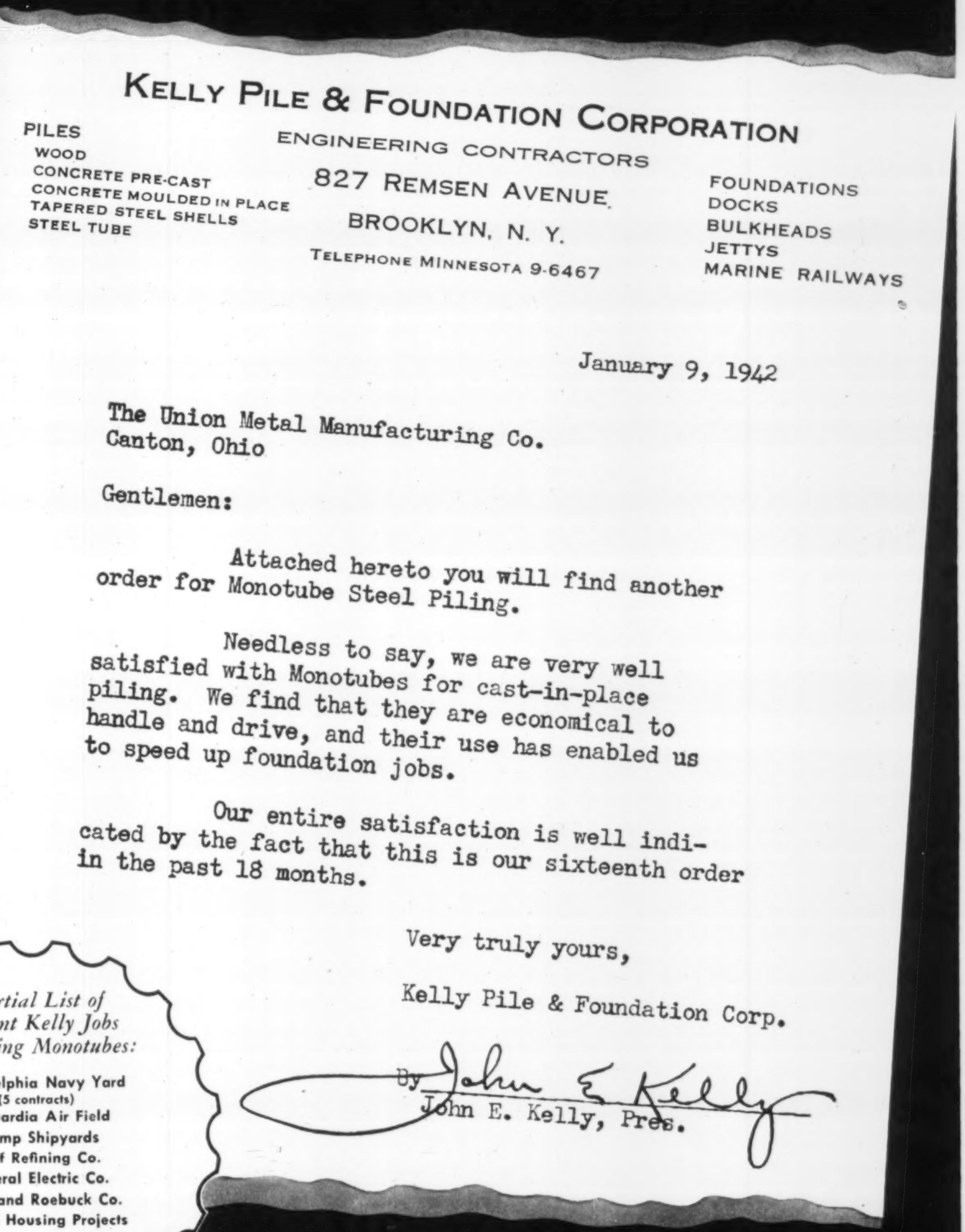
GIBSON, ROBERT CLAYTON (Assoc. M.), Little Rock, Ark. (Age 47) (Claims RCA 6.7 RCM 16.5) Aug. 1924 to date Prin. Asst. Bridge Engr., Arkansas State Highway Comm.

GIVOTOVSKY, VICTOR TIMOTHY (Assoc. M.), Washington, D.C. (Age 48) (Claims RCA 10.1 RCM 11.4) April 1931 to date Senior Structural Engr. and Chf., Structural Div. (Municipal Group), Eng. Dept.

GREENE, EDWARD OLIVER, West Barrington, R.I. (Age 43) (Claims RCA 6.2 RCM 13.7) May 1923 to date in private practice as Civ. Engr.

Here's an Expert's Experience with MONOTUBES





KELLY PILE & FOUNDATION CORPORATION
ENGINEERING CONTRACTORS
827 REMSEN AVENUE
BROOKLYN, N. Y.
TELEPHONE MINNESOTA 9-6467

PILES
- WOOD
- CONCRETE PRE-CAST
- CONCRETE MOULDED IN PLACE
- TAPERED STEEL SHELLS
- STEEL TUBE

FOUNDATIONS
DOCKS
BULKHEADS
JETTYS
MARINE RAILWAYS

January 9, 1942

The Union Metal Manufacturing Co.
Canton, Ohio

Gentlemen:

Attached hereto you will find another order for Monotube Steel Piling.

Needless to say, we are very well satisfied with Monotubes for cast-in-place piling. We find that they are economical to handle and drive, and their use has enabled us to speed up foundation jobs.

Our entire satisfaction is well indicated by the fact that this is our sixteenth order in the past 18 months.

Very truly yours,

Kelly Pile & Foundation Corp.

By John E. Kelly
John E. Kelly, Pres.

Partial List of Recent Kelly Jobs Involving Monotubes:

Philadelphia Navy Yard
(5 contracts)
LaGuardia Air Field
Cramp Shipyards
Gulf Refining Co.
General Electric Co.
Sears and Roebuck Co.
Federal Housing Projects

"Keep 'Em Flying"

● The above approval is typical of others received, not only from well-known Eastern contractors but wherever Monotubes have been used for cast-in-place concrete piles. You can rest assured that these tapered steel casings have passed every known field test for speed, economy and dependability.

Union Metal's experienced engineers will be glad to help you adapt Monotubes to your particular foundation needs. Write for copy of Catalog No. 68A.

THE UNION METAL MANUFACTURING CO. CANTON, OHIO

Heine, Francis Adolph (Assoc. M.), Reading, Pa. (Age 44) (Claims RCA 8.5 RCM 9.0) Oct. 1922 to date with Bureau of Water, Reading, Pa., as Engr. of Surveys, Distribution Engr., Asst. Chf. Engr., and (since March 1940) Chf. Engr.

Humphreys, Guy Howard, Reading, Berks, England. (Age 46) (Claims RCA 0.5 RCM 21.7) 1915 to date with Howard Humphreys, Cons. Engr., and Howard Humphreys & Sons, Westminster, London, England, as Maintenance Engr., Asst. to his father, Res. Engr., and (since 1925) member of firm.

Johnson, Irving Laurence (Assoc. M.), Pearl Harbor, Hawaii. (Age 35) (Claims RCA 4.6 RCM 7.3) April 1941 to date Lieut., CEC., U.S.N.R.; previously Staff Engr. with Donald R. Warren, Cons. Structural and Civ. Engr., and Allied Engrs., both of Los Angeles, Calif.; Asst. Dist. Mgr., Raymond Concrete Pile Co., Los Angeles.

Kennedy, Ralph Walter, St. Paul, Minn. (Age 53) (Claims RCA 9.9 RCM 13.0) Aug. 1941 to date Prin. Constr. Engr., War Dept., Corps of Engrs., Office of Area Engr., Twin Cities Ordnance Plant, New Brighton, Miss.; previously R.R. Engr., The Widmer Eng. Co., St. Louis; with FWA, PWA, Missouri as Res. Engr. Inspector, Office Engr., Relief Engr., Chf. Res. Engr. Inspector, and Asst. Project Engr.

Kinneman, William Paul, Westfield, N.J. (Age 39) (Claims RCA 3.0 RCM 8.0) June 1924 to date with Raymond Concrete Pile Co., New York City, as Jun. Engr., Material Clerk, Eng. Asst. to Job. Supt., Supt., Draftsman and Designing Engr., etc., and (since Aug. 1937) Designing Engr.

Kopf, Herbert Prebble, Rochester, N.Y. (Age 36) (Claims RCA 6.0 RCM 8.0) Sept. 1929 to date Asst. Engr., City of Rochester.

Livermore, Joseph Mason, Ridgewood, N.J. (Age 49) (Claims RCA 6.8 RCM 13.9) Nov. 1940 to date with U.S. Rubber Co., New York City, as Plant Engr., Mechanical Goods Div., Passaic, N. J., and (since July 1941) Res. Engr. for Company Prime Contractor; previously Res. Engr., Lockwood-Green Engrs., Inc., New York City.

Murray, John Joseph, Pittsburgh, Pa. (Age 37) (Claims RCA 2.7 RCM 5.0) Dec. 1934 to Oct. 1935 and March 1937 to date with City of Pittsburgh, as Chf. of Party with Depts. of City Planning and Public Works, Senior Designing Draftsman, Div. of Bridges and (since June 1938) Div. Engr., in charge of Eng. Div., Bureau of Bldg. Inspection; in the interim with Pittsburgh-Des Moines Steel Co.

Ochs, Karl William, Chevy Chase, Md. (Age 37) (Claims RCA 3.0 RCM 8.0) 1935 to date Asst. Chf. Engr., Rosslyn Steel & Cement Co., Washington, D.C.

Paulson, Frederick Holroyd (Assoc. M.), Providence, R.I. (Age 44) (Claims RCA 5.3 RCM 13.1) Jan. 1940 to date Senior Structural Engr. and Associated with Charles A. Maguire and Associates; previously Engr. with Jenks & Ballou; with Oresto DiSaia as Cons. Engr., and Chf. Engr.

Pettis, Charles Emerson, Toledo, Ohio. (Age 40) (Claims RCA 4.5 RCM 13.5) July 1933 to Jan. 1940 Associate Engr., Champe, Finkbeiner & Associates, Cons. Engrs., and Jan. 1940 to date member of firm, Finkbeiner, Pettis and Strout, Cons. Engrs.

Pregnoff, Michael Victor, San Francisco, Calif. (Age 41) (Claims RCA 3.5 RCM 10.4) Jan. 1938 to date member of firm, Hall & Pregnoff, Structural Engrs.; previously Structural Engr. for Oakland (Calif.) Board of Education.

Pyle, Robert Frederick Macbeth, Hampton, Va. (Age 54) (Claims RCA 12.2 RCM 12.8) March 1934 to date in private practice of civil and mechanical engineering, Newport News, Va.

Sechrist, William Carroll, Balboa, Canal Zone. (Age 44) (Claims RCM 17.6) Oct. 1941 to date Associate Structural Engr., The Panama Canal, Balboa Heights, C.Z.; previously with Virginia Steel Co., Richmond, W. F. Jackson Co. Inc., and Geo. Hyman Constr. Co., both of Washington, D.C.

Thatcher, John Howard, Englewood, N.J. (Age 36) (Claims RCA 4.5 RCM 9.4) April 1928 to Feb. 1931 Supt., and Feb. 1931 to date Vice-Pres., John Thatcher & Son, Brooklyn, N.Y.

Torroja Miret, Edward, Madrid, Spain. (Age 42) (Claims RCM 13.4) Sept. 1939 to date Prof. of Elasticity and Reinforced Concrete Structures, State School of Civil Engineers, Madrid; previously Engr. of harbors of Malaga and Parajes.

Tsagaris, Dean Peter, Knoxville, Tenn. (Age 39) (Claims RCA 4.8 RCM 5.9) Oct. 1935 to date Structural Engr., Eng. & Constr. Dept., Constr. Plant Div., TVA.

Weber, Emil August, Manitowoc, Wis. (Age 58) (Claims RCA 9.4 RCM 23.8) May 1926 to Dec. 1941 Secy.-Treas., and Jan. 1942 to date Pres., McMullen & Pitz Constr. Co.

Whitworth, George Frederick, Ithaca, N.Y. (Age 44) (Claims RCA 6.3 RCM 6.2) April 1934 to date Field Supervisor, National Park Service.

Youngs, Gilbert Ainsworth, Atlanta, Tex. (Age 35) (Claims RC 12.6 D 8.0) Feb. 1928 to date with Texas Highway Dept., as Office Asst., Asst. Engr., Chf. Inspector, Asst. Res. Engr., Asst. Div. Engr., Res. Engr., and (since April 1941) Senior Res. Engr.

APPLYING FOR ASSOCIATE MEMBER

Ackerman, Jerome Otto (Junior), St. Paul, Minn. (Age 33) (Claims RCA 6.8) June 1928 to date with U.S. Engr. Office as Surveyman, Jun. and Asst. Engr., Associate Engr., and (since Nov. 1940) Engr.-in-Chg., Design Sec.

Allan, Robert Myers (Junior), Albany, Calif. (Age 30) (Claims RCA 5.8) Oct. 1934 to date Engr., Standard Oil Co. of California, San Francisco.

Auld, David Vinson, Washington, D.C. (Age 34) (Claims RCA 5.4 RCM 3.7) July 1929 to date with Sewer Div., Eng. Dept., Dist. of Columbia, as Inspector, Computer, Asst. Design Engr., Associate Engr., and (since Oct. 1940) Senior Engr., being Engr.-in-Chg. PWA sewer projects.

Bell, Aubrey Blan (Junior), Austin, Tex. (Age 32) (Claims RCA 1.7) June 1939 to date Factory Representative, Keuffel & Esser Co., Hoboken, N.J.; previously Asst. to H. L. Thackwell, Cons. Engr.; Topographer and Tech. Asst., Texas State Reclamation Dept.

Bosland, Frank Everet (Junior), Knoxville, Tenn. (Age 32) (Claims RCA 6.9) Feb. 1935 to date with TVA, as Eng. Draftsman, Jun. Highway Engr., Asst. Highway Engr., and (since Dec. 1941) Associate Highway Engr.

Bruce, William Henry, Jr., Newark, Del. (Age 33) (Claims RCA 4.2 RCM 1.1) Feb. 1939 to date Res. Engr., Parsons, Klapp, Brinckerhoff & Douglas, Engrs.; in the interim Asst. Engr. and Res. Engr., Madigan-Hyland, Cons. Engrs.

Charles, John Roy (Junior), Pittsburgh, Pa. (Age 30) (Claims RCA 2.9 RCM 3.2) Feb. 1936 to date with Layne-New York Co., Inc., as Dist. Engr., Pittsburgh, Pa.

Coe, Donald Omer, Vicksburg, Miss. (Age 40) (Claims RCA 8.5) June 1941 to date Asst. Engr. (Civil), U.S. War Dept., Vicksburg (Miss.) U.S. Engr. Office; previously Asst. Naval Archt., U.S. Navy Dept., Philadelphia, Pa.; Designing Engr. and Plant Engr., The Lock Joint Pipe Co., Ampere, N.J.; Asst. Engr. and Res. Engr. with Weston & Sampson, Cons. Engrs., Boston.

Cruickshank, Douglas Spencer (Junior), Santa Rosa, Calif. (Age 32) (Claims RCA 1.8) Feb. 1940 to date with U.S. Engr. Office, San Francisco, as Jun. Engr. (Civil), and (since Sept. 1941) Asst. Engr. (Civil); previously Jun. Topographic Engr., U.S. Geological Survey, Sacramento, Calif.

Dickerson, Ellis R. Jackson, Miss. (Age 37) (Claims RCA 4.5 RCM 8.5) Feb. 1924 to date with City of Jackson, Miss., as Rodman, Inspector, Instrumentman, Engr., Office Engr., etc., and (since Oct. 1935) Asst. City Engr.

Dowling, Wallace Eugene (Junior), Omaha, Nebr. (Age 32) (Claims RCA 3.7) Nov. 1938 to Aug. 1941 Draftsman, Bridge and Bldg. Office, and Aug. 1941 to date Bridge and Structural Designer, Union Pacific R.R.; previously Structural Designer, Hydraulics Div., Central Nebraska Public Power and Irrigation Dist., Hastings, Nebr.

English, Cyril Scales, Redding, Calif. (Age 32) (Claims RCA 4.2 RCM 0.6) Jan. 1936 to date with U.S. Bureau of Reclamation, as Transitman, Instrumentman, and (since Nov. 1939) Chf. of Party.

Faircloth, James Manning, University, Ala. (Age 38) (Claims RCA 9.1) Sept. 1928 to Sept. 1930 Instructor in, Sept. 1930 to May 1940 Asst. Prof., and May 1940 to May 1941 and since Sept. 1941 Associate Prof. of, Civ. Eng., Univ. of Alabama.

Flanigan, Pierce John, Jr. (Junior), Baltimore, Md. (Age 30) (Claims RCA 4.7) July 1938 to date Secy.-Treas., P. Flanigan & Sons, Inc.; previously Jun. Engr., U.S. Bureau of Public Roads, Washington, D.C.

Flockhart, John Steel, Newark, N.J. (Age 44) (Claims RCA 13.1 RCM 1.4) Oct. 1930 to date with Dept. of Public Works, Bureau of Street Cleaning, City of Newark, N.J., as Asst. Engr., Prin. Asst. Engr., and (since Jan. 1941) Supervising Engr.

Garrison, Delmer George, Detroit, Mich. (Age 30) (Claims RCA 3.4 RCM 0.8) July 1937 to date with Sales Constr. Dept., Sun Oil Co., as First Class Draftsman, Field Engr., and (since March 1941) Western Regional Engr.; previously Engr., Munz Spralawn Corporation.

Gould, Harold Moffet, Blue Springs, Mo. (Age 56) (Claims RCA 9.7 RCM 6.9) Oct. 1940 to date Industrial Engr., Smith, Hinchman and Grylls, Inc., Engrs. and Archts., Detroit, Mich.; previously Research Asst., Michigan State Employment Service; Research Editor, Pulaski School, Hamtramck, Mich.; with National Employment Service, U.S. Dept. of Labor, Detroit.

Heymann, Curt Joseph, Durban, South Africa. (Age 31) (Claims RCA 5.4) Sept. 1940 to date Civ. and Structural Engr., Corporation of City of Durban, Umgeni Water Scheme; July to Sept. 1940 Surveyor, Stubb, Sullivan & Barbour, Surveyors and Archts., Durban; previously Structural Engr., The Reinforcing Steel Co., Durban.

Hill, Donald Graybill, Gilbertsville, Ky. (Age 32) (Claims RCA 2.6) April 1935 to date with TVA as Eng. Draftsman, Eng. Data Div., Inspector of Constr. at Chickamauga Dam, and (since Aug. 1939) Associate Field Engr., Kentucky Dam.

Lee (Formerly Li), Richard Szu-Mien, Flushing, N.Y. (Age 41) (Claims RCA 4.5 RCM 2.0) June 1935 to date Asst. Engr., successively with Taylor-Fichter Steel Constr. Co., Robinson & Steinman, Cons. Engr., Parsons, Klapp, Brinckerhoff & Douglas, and (since July 1940) with Waddell & Hardesty.

Lyell, Herbert Leslie (Junior), Palo Alto, Calif. (Age 32) (Claims RCA 3.4) Nov. 1940 to date Structural Designer with H. J. Brunnier; previously Draftsman and Designer, Columbia Constr. Co., Redding, Calif.; Office Engr., Permanente Corporation, San Jose, Calif.; Research and Industrial Engr., Soule Steel Co., San Francisco.

Middleton, Stephen Roche, Corpus Christi, Tex. (Age 35) (Claims RCA 5.4 RCM 4.1) Oct. 1928 to date with Texas Highway Dept., as Instrumentman, Asst. Res. Engr., etc., and (since Sept. 1938) Gen. Foreman and Dist. Maintenance Engr.

Miller, Arthur Leslie (Junior), Sacramento, Calif. (Age 30) (Claims RCA 6.0 RCM 1.4) Dec. 1938 to date Structural Designer and Draftsman, E. D. Francis, Cons. Engr.; previously Structural Eng. Associate, California Div. of Archt., Dept. of Public Works; Structural Designer and Draftsman with Murray Erick and Mark Falk, both Cons. Engrs., and Structural Designer with Edwin Rudolph, Structural Engr.

Mitchell, Robert Dale (Junior), New York City. (Age 31) (Claims RCA 2.7) June 1939 to date Asst. Engr. with Malcolm Pirnie, Civ. Engr.; previously Asst. in San Eng., Graduate School of Eng., Harvard Univ.; Instructor in Civ. Eng., South Dakota State Coll., Brookings, S.Dak.

Mosher, Lloyd William, Detroit, Mich. (Age 41) (Claims RCA 13.3) June 1936 to date with City of Detroit, Mich., as Jun. Civ. Engr., Dept. of Public Works, and (since Nov. 1940) Constr. Foreman, Dept. of Water Supply.

Pritchard, Francis Thomas (Junior), Oakland, Calif. (Age 32) (Claims RCA 4.8 RCM 0.7) Nov. 1939 to date with Bureau of Yards and Docks, U.S. Navy, at present Lt. (jg), CEC, U.S.N.R.; previously Senior Engr., Alameda County, Oakland, Calif.; Asst. and Associate Structural Engr., and Inspector, Golden Gate International Exposition, San Francisco.

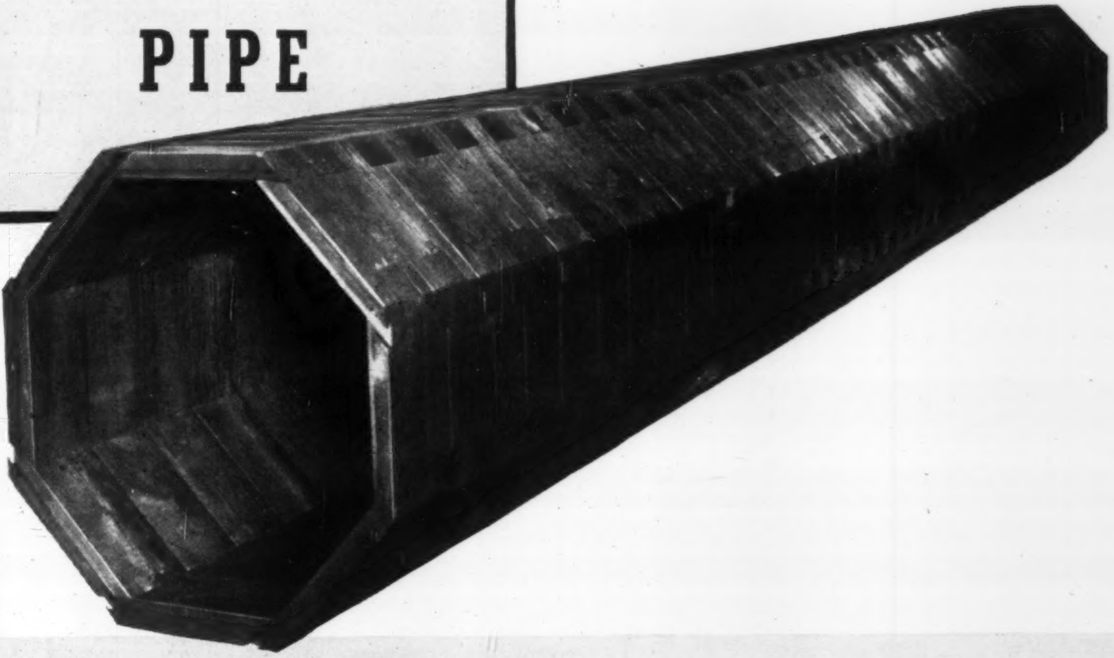
Russell, Leroy Burnett, Los Angeles, Calif. (Age 41) (Claims RCA 2.6 RCM 0.5) Aug. 1940 to date Prin. Structural Draftsman, U.S. Dept. of Interior, Office of Indian Affairs, Irrigation Service; previously Structural Draftsman. State of California, and with E. Francis, Structural Engr., Sacramento; Constr. Engr., Shell Oil Co., San Francisco.

Sartain, Raymond Robey, Ancon, Canal Zone. (Age 32) (Claims RCA 2.2) Sept. 1940 to date Capt., Corps of Engrs., QMC, U.S. Army, since Oct. 1941 Constr. Q. M. and Area Engr.; previously with Texas Highway Dept., and National Park Service, etc.

Sears, Abram Funk, Moline, Ill. (Age 32) (Claims RCA 2.1) April 1941 to date with U.S. Engrs. at Rock Island, Ill., as Jun. Engr., Design Sec., Dist. Office; previously in private practice of farming and engineering.

Senesy, John Joseph (Junior), Elizabeth, N.J. (Age 29) (Claims RCA 4.7) June 1939 to date Engr. and Constr. Mgr., Construction Service

NEW EMERGENCY PIPE



Solves War-Time Drainage Problems

Steel, a critical war material, must not be used in any drainage structure except where engineering integrity demands it. Yet here is a practical war-time substitute. It's the Armco Emergency Pipe, designed by a drainage engineering organization with 38 years' experience.

This completely new design in wood drainage structures meets war-time emergency requirements. Steel bands, metal reinforcing or other critical materials are not required. The semi-flexible design provides ample strength to meet engineering standards. Yet this Emergency Pipe is light in weight for easy handling. Installation cost is low. There is no field assembly except joining long sections of any length that can be hauled and handled. Skilled labor is not needed.

On the durability side Armco Emergency Pipe performs admirably as a war-time structure. It goes "all-out" in meeting the War Production Board's requirements for substituting non-critical materials wherever possible.

Use the Armco Emergency Pipe for essential culverts, storm sewers, underpasses, conduits or wherever else drainage structures are needed and vital materials must be conserved. Your request will bring complete information. Armco Drainage Products Association, 425 Curtis St., Middletown, Ohio.

ARMCO ARMCO **EMERGENCY PIPE**

Co., Inc., Elizabeth, N.J.; June 1936 to June 1939 Constr. Engr., A. S. Wikstrom Co. and Railroad Maintenance Co., Bound Brook, N.J.

Shanley, Edmund Michael (Junior), New York City. (Age 31) (Claims RCA 1.1 RCM 1.1) March 1941 to date Lieut., CEC, U.S.N.R. (active duty); previously Constr. Engr., Heafey Moore, Frederickson & Watson Constr. Co.; Office and Field Engr. with C. C. Kennedy, Blackie & Wood, and I. H. Althouse, Cons. Engrs.; Constr. Engr., Valley Constr. Co.

Silverman, Max, Brooklyn, N.Y. (Age 43) (Claims RCA 8.7 RCM 5.6) Jan. 1935 to April 1937 and Aug. 1938 to date with Dept. of Parks, as Supt. of Constr., and (since Aug. 1938) Asst. Engr., Arsenal, Central Park; in the interim Bridge Designer, Robinson & Steinman, and Asst. Engr., Dept. of Public Works, Bureau of Bridges, City of New York.

Skidmore, Robert Wilson, Birmingham, Ala. (Age 37) (Claims RCA 5.6 RCM 6.0) April 1941 to date with J. B. Converse & Co., and A. C. Polk, as Asst. Chf. Inspector, and (since July 1941) Chf. Inspector; previously Chf. of Party, Tennessee Coal, Iron & R.R. Co.; Res. Engr. Inspector, PWA.

Stueber, Gustav, Drexel Hill, Pa. (Age 32) (Claims RCA 2.0 RCM 3.6) July 1941 to date Designing Engr. and Squad Leader, United Engrs. & Constrs. Inc., Philadelphia, Pa.; previously Designing Engr., Pittsburgh-Des Moines Steel Co., Des Moines, Iowa; Structural Engr., Northern American Power Utility.

Sutton, Harold Nelson, Charlotte, N.C. (Age 50) (Claims RCA 14.7 RCM 3.8) Oct. 1933 to date with City of Charlotte, N.C., as Engr. and Supervisor for WPA and ERA, Engr., Park & Recreation Comm., and (since Aug. 1937) Res. Engr. on construction work.

Taylor, Virginius Leslie, Montgomery, Ala. (Age 34) (Claims RCA 7.8 RCM 2.1) Dec. 1933 to Feb. 1938, March 1939 to Oct. 1940 and Oct. 1941 to date with Alabama Highway Dept., as Res. Engr., Asst. Bridge Engr., and Div. Constr. Engr.; in the interim with S. R. Batson Constr., Co., Birmingham, Ala., and with U.S. Army as 2d Lt., Corps of Engrs., and 1st Lt., QMC, Constr. Div.

Tobias, Marion Herbert, Jackson, Miss. (Age 33) (Claims RCA 4.3) July 1935 to date with WPA for Mississippi, as Area Asst. to Engr., Area Engr., Area Supervisor, Asst. Area Supervisor, Acting Asst. State Director of Operations, Acting State Director of Operations, and (since Oct. 1941) State Director of Operations.

Wagner, John William, Mantua, Ohio. (Age 33) (Claims RCA 7.5 RCM 2.0) Jan. 1942 to date Computing Draftsman with Fraser-Brace Eng. Co., Keystone Ordnance Plant, Geneva, Pa.; previously with F. A. Pease Eng. Co., and Wilbur Watson & Associates, on Ravenna (Ohio) Ordnance Plant; with Erie R.R. Co., on various work.

Warlam, Arpad Antal (Junior), Cambridge, Mass. (Age 33) (Claims RCA 1.8 RCM 1.7) March 1940 to date Research Asst., Harvard Univ.; previously Jun. Engr., and Asst. Engr., Royal Hungarian Ministry of Commerce and Communications; Asst. in Civ. Eng., Royal Hungarian Joseph Univ. of Technical Science.

Warren, Alfred Wingate, Chicago, Ill. (Age 41) (Claims RCA 15.7) March 1926 to date with Lathrop-Hoge Constr. Co., Cincinnati, Ohio, as Supt., Sales Engr., junior partner, etc., and (since Jan. 1941) full partner.

Westerfeld, Stuart Clarence (Junior), Arlington, Va. (Age 33) (Claims RCA 4.3) May 1935 to June 1937 1st Lieut., and Oct. 1940 to date Capt., Constr. Div., U.S. Army, since Aug. 1941 Unit Chf., Washington Office; in the interim Asst. Field Engr., Semet-Solvay Eng. Corporation, New York City, and Jun. Engr., U.S. Dist. Engr., Cincinnati, Ohio.

White, Lloyd Young, Washington, D.C. (Age 48) (Claims RCA 24.0) 1930 to date with H. H. Robertson Co., as Branch Mgr. and Sales Engr., San Francisco, Calif., and (since 1939) Asst. Mgr. of Govt. Sales and Sales Engr., Washington, D.C.

APPLYING FOR JUNIOR

Brasher, Herbert, Lubbock, Tex. (Age 26) May 1938 to date (until June 1939 while student) with Carl L. Svensen, Engr. and Archt., as Draftsman, Supt. of Constr. and Structural Designer.

Ellis, Harold Herbert, New Philadelphia, Ohio. (Age 27) March 1940 to date with U.S. Geological Survey, Ohio Dist., Columbus, Ohio, measuring surface run-off and working up records for publication; previously Draftsman, Babcock & Wilcox Co., Barberton, Ohio; Draftsman, Power Service Corporation, Minneapolis, Minn.

Hall, Howard Pickering, Dorchester, Mass. (Age 26) Sept. 1941 to date graduate student in soil mechanics, Harvard Univ.; Sept. 1939 to Sept. 1941 Instructor in Civ. Eng., Northwestern Technological Inst., Evanston, Ill.; previously with Mark Linenthal Cons. Engr., Boston, Mass.; Instructor, Brown Univ., Providence, R.I.

Joe, Alvin Kay Yip, Salt Lake City, Utah. (Age 28) 1937 B.S., and 1939 M.S., in Civ. Eng., Univ. of Calif.; Nov. 1941 to date Draftsman and Designer, Utah Copper Co.

Johnson, Carleton Brown, Detroit, Mich. (Age 26) (Claims RCM 3.5) June 1938 to date in direct charge (under his father) of C. A. Johnson & Son, Building Moving, Underpinning and Shoring Engrs.

Milliken, Donald Leroy, Brighton, Mass. (Age 25) (Claims RCA 3.4) 1938 B.S. Worcester Pol. Inst.; Nov. 1938 to Jan. 1942 Jun. Engr., and Jan. 1942 to date Asst. Engr., U.S. Geological Survey, Boston, Mass.

Sexton, Harold Weber, Portland, Ore. (Age 24) (Claims RCA 0.7) June 1941 to date 2d Lt., Corps of Engrs., U.S. Army; previously with Oregon State Highway Dept. as Chainman, Office Computer and Materials Inspector; Aerial Photograph Mapping Asst. with County Agent, Wasco County, The Dalles, Ore.

Silver, Edward Charles, Knoxville, Tenn (Age 31) 1941 B.S. in Civ. Eng., Mich. Coll. of Min. & Tech.; Oct. 1940 to date with TVA, as Eng. Aide and Jun. Civ. Engr., and (since Jan. 1942) Jun. Civ. Engr.

1941 GRADUATES

UNIV. OF CALIF.
(B.S. in Civ. Eng.)

	Age
Bresler, Boris	(23)
Bryan, Francis Edward	(24)
Cline, John Henry, Jr.	(22)
Cooke, Arthur Henry	(24)
Eaton, Henry Arnold	(22)
Etingen, Abraham Joel	(26)
Gasperetti, Eustachio Joseph	(26)
Goplen, Ralph Arthur	(23)
Johns, Joseph Thomas, Jr.	(22)
Johnson, Carl William	(25)
Kaufman, Alfred	(22)
Oddstad, Andres Fjeldsted, Jr.	(23)
Stenen, Norman Hanson	(23)
Wilkins, Richard Cameron	(23)

UNIV. OF KANS.
(B.S. in Arch. Eng.)

Beets, Frank Arnold	(24)

UNIV. OF WASH.
(B.S. in Civ. Eng.)

Clayman, Herbert Sidney	(23)
Derrick, Edwin	(24)

1942 GRADUATES

DUKE UNIV.
(B.S. in C.E.)

Dunn, William Redfield	(23)

UNIV. OF ILL.
(B.S.)

Knight, Mark Gieger	(23)
Vallbau, Edward Dorney	(23)

COLL. OF CITY OF N.Y.
(B.C.E.)

Feld, Lester Solomon	(20)
Petrino, Michael Anthony	(22)
Sperber, Philip	(20)
Stolz, John Francis	(20)

UNIV. OF SO. CALIF.
(B.E.)

Barstow, Carl Kiva	(23)

STATE COLL. OF WASH.
(B.S. in C.E.)

Calkins, Myron Donald	(22)

The Board of Direction will consider the applications in this list not less than thirty days after the date of issue.

Engineering Societies Personnel Service, Inc.

New York	Chicago	Detroit	San Francisco
31 W. 39th St.	211 W. Wacker Dr.	100 Farnsworth Ave.	57 Post St.

The items listed below have been furnished by the Engineering Societies Personnel Service, Inc., which is under the joint management of the Four Founder Societies. This service is available to members and is operated on a cooperative, non-profit basis. In applying for positions advertised by the Service the applicant agrees, if actually placed in a position through the Service as a result of these advertisements, to pay a placement fee in accordance with the rates as listed by the Service. These rates have been established in order to maintain an efficient, non-profit personnel service and are available upon request. This also applies to registrants whose notices are placed in these columns. All replies should be addressed to the key numbers indicated and mailed to the New York Office.

A weekly bulletin of engineering positions open is available to members of the cooperating societies at a subscription of $3 per quarter or $10 per annum, payable in advance.

MEN AVAILABLE

General Construction Superintendent; M. Am. Soc. C.E.; graduate engineer. Recently completed large army camp; 20 years experience in all types of industrial and commercial buildings, utilities, etc. Accustomed to planning and carrying out entire project. Now employed but available on reasonable notice. C-909.

Civil Engineer; M. Am. Soc. C.E.; 57; married; graduate civil engineer; registered professional engineer in Pennsylvania; experienced; in responsible charge of design and construction of highways, sewers, water works, buildings; valuation work, investigations, reports, municipal and government work. Available two weeks' notice. Location preferred, Pittsburgh region. C-910.

Building Contracting Engineer; M. Am. Soc. C.E.; New York license; age 53; married; during past 18 years partner in long established non-defense building contracting business; organized masonry department, hiring all labor and purchasing all materials and equipment; handled structural designs, preparation of bids, and construction of hundreds of buildings of all types; seeks new connection during war emergency. C-911.

Civil Engineer; Jun. Am. Soc. C.E.; 29; married; Highway Research Board; University of Minnesota training; 2 years with private consulting engineer; $3^{1}/_{2}$ years superhighway and parkway design and construction; one year municipal work; $2^{1}/_{2}$ years railroad engineering and heavy construction; location United States. Available two weeks' notice. Location preferred, United States (Middle West or West). C-913-422-A-1. San Francisco.

Project Manager; M. Am. Soc. C.E.; qualified by broad experience to organize and supervise all phases of large war project including employment of personnel, purchasing materials and equipment, designing plans and specifications, execution of construction with contracts, subcontracts or on a force account basis. Anywhere in United States. C-915.

Graduate Civil Engineer; M. Am. Soc. C.E.; New York license; 12 years experience in structural and architectural design; 7 years research on and design and construction of prefabricated houses; desires connection with company engaged in prefabrication. Available on month's notice; New York City preferred. C-912.

Civil Engineer Executive; M. Am. Soc. C.E.; broad experience in highways, bridge building, including caissons and deep foundations, municipal work, railroad construction, building work; experience as contractor and as government engineer on large projects; equipped to organize and supervise field or office force on extensive projects during either planning or construction period. East preferred. C-914.

Positions Available

Structural Engineer, 30–50, graduate civil engineer with at least four or five years experience in design of fabricated steel buildings and reinforced concrete structures. Should know strength of materials and, if possible, be a registered professional engineer or have sufficient background to obtain license. Salary, $3,000–$3,600 a year. Permanent. Location, Middle West. Y-9711.

Structural Steel and Concrete Designer who is capable of taking full responsibility for design. Temporary. Location, Middle West. Y-9819.

Draftsmen (*a*) Senior Architectural Draftsman. (*b*) Structural Engineers for steel and reinforced concrete buildings. (*c*) Reinforced Concrete Bar Detailers. Location, South. Y-9838.

Engineers with a few years experience in investigation and design, problems in water supply, distribution and treatment, sewerage, sewage pumping and treatment—especially men with recent design and drafting experience in these lines, to work with civil, mechanical, and electrical engineers who are available for consultation on their special aspects of sanitary engineering problems. Temporary. Salary, $3,200 a year. Location, South. Y-9888.

Designers who have had considerable experience on all types of structural work. Company needs steel, reinforced concrete, drainage, water supply, plumbing, and heating and piping designers. Salary open. Location, New York State. Y-9915.

Junior Construction Engineers to act as transitmen to give line and grade on foundation pile work; also to act as inspectors on the job. Salary, $2,600 a year plus overtime. Location, South. Y-9922.

Civil Engineer for office engineering work on large general construction project. Salary, $3,120–$4,680 a year. Location, Rhode Island. Y-9939.

Civil Engineer, young, to assist building construction engineer on water main, drainage, grading, design of auxiliary buildings. Location, western New York. Y-9953.

Engineer familiar with level and transit; some drafting experience desirable; outside field inspection—buildings, concrete, structures and concrete; preferably some railroad experience. Salary, $2,400–$2,900 a year. Location, South. W-42.

Inspectors, graduate civil engineers or with degree in some type of engineering akin to civil or equivalent experience plus approximately 6 years experience in engineering construction. Salary, $2,600–$3,380 a year. Location, New England. W-66.

Instructor, graduate civil engineer. Prefer someone who has an M.S. degree to teach civil engineering subjects in a New England university. Permanent. Salary, $1,800 a year. W-67.

Construction and Assistant Construction Engineers and Superintendents for general field inspection of construction projects, primarily industrial buildings; must also approve all invoices and payrolls. Salary, $2,600–$3,800 a year. Location, South. W-68.

Designer who has had experience on continuous concrete girder bridge design. Duration, about six months. Salary, $3,600 a year, plus overtime. Location, New York, N.Y. W-70.

Designers, Draftsmen, and Detailers experienced in structural steel or reinforced concrete, also timber. Should know structural and industrial building work. Salary, Draftsmen, $1,800–$3,600 a year, 40-hour week; 8 hours overtime, paid at time and a half, makes it $2,340–$4,680 a year. Location, Middle West. W-83.

Construction Engineer and Superintendent to head up large heavy construction project, including roads, sewers, town site, etc. Must be able to speak Spanish. Salary open. Duration, 18 months. Location, Central America. W-86.

Senior Inspector on concrete and steel construction. Salary, $3,100 a year, 48-hour week. Location, New York, N.Y. W-105.

Designers and Draftsmen (*a*) Structural Designers and Draftsmen, concrete and steel, preferably with power house experience. Salaries, $3,000–$3,600 a year. Location, Delaware. W-127.

Graduate Civil Engineer who has had a good educational course in soil mechanics as well as some practical experience in this work. Laboratory man not desired. Some knowledge of foundation design would be helpful. Temporary. Salary, $2,000–$2,600 a year. Location, New York, N.Y. W-136.

Supervisor, graduate civil engineer with from 6 to 8 years experience in the design and field construction of heavy reinforced concrete structures. Work in office and some field inspection. Salary, $3,200 a year. Location, New York, N.Y. W-152.

Inspectors, graduate civil engineers for heavy construction and timber work. Some experience in foundations desirable. Salary open. Locations, Jacksonville, Fla.; New Orleans, La.; and West Coast. Also need recent Graduate Civil Engineer for inspection. Should know something about dredging and general construction. Salary, about $1,800–$2,200 a year. W-153.

RECENT BOOKS

New books of interest to Civil Engineers donated by the Publishers to the Engineering Societies Library, or to the Society's Reading Room, will be found listed here. The notes regarding the books are taken from the books themselves, and this Society is not responsible for them.

Aerial Bombardment Protection. By H. E. Wessman and W. A. Rose. John Wiley & Sons, New York; Chapman & Hall, London, 1942. 372 pp., illus., diagrs., charts, tables, $9\frac{1}{2} \times 6$ in., cloth, $4.

This book is primarily devoted to a detailed discussion of the measures that can and should be undertaken to make building construction resistant to the effects of bombing, at reasonable cost. Characteristics of bombs, air-raid shelters, evaluation of shelter zones, and camouflage are also considered. A brief statement of other engineering problems related to aerial bombardment is also included. The material has been developed with particular regard for American structural and architectural practice.

Aerophotography and Aerosurveying. By J. W. Bagley. McGraw-Hill Book Co., New York and London, 1941. 324 pp. illus., diagrs., charts, tables, $9\frac{1}{2} \times 6$ in., cloth, $3.50.

Broad in scope, logical in arrangement, and up to date, this new text covers the fields of standard and exploration mapping. The chief aim of the book is to deal with aerial photographs, standard laboratory practice, and the various methods of utilizing aerial photographs for making standard and exploratory maps, mosaics, and engineering surveys.

American Highway Practice, Vol. 1. By L. I. Hewes. John Wiley & Sons, New York; Chapman & Hall, London, 1942. 459 pp., illus., diagrs., charts, maps, tables, $9\frac{1}{2} \times 6$ in., cloth, $5.

This first volume of a two-volume text on current rural highway practice in the United States presents in logical order the topics of highway survey, roadway and landscape design, and grading practice. Succeeding chapters deal with sand-clay, macadam, gravel, and intermediate bituminous surfaces. Higher types of surfaces will be covered in the second volume.

Bonanza Railroads. By G. H. Kneiss. Stanford University Press, Stanford University, Calif., 1941. 148 pp., illus., woodcuts, tables, $10\frac{1}{2} \times 7$ in., cloth, $3.

The five small California and Nevada railroads whose stories are presented in this volume were built for the purpose of monopolizing various bonanzas. As the mines were exhausted or railroad mergers put through, they died or lost their individualities, but for a time each played its part in the colorful development of the West. The author is an authority in his field and has included much factual information.

Eastern Photoelasticity Conference, 13th Semi-Annual Proceedings, held under the auspices of the Department of Mechanical Engineering at the Massachusetts Institute of Technology, Cambridge, Mass., June 12–14, 1941. 130 pp., illus., diagrs., charts, tables, $11 \times 8\frac{1}{2}$ in., paper, $2. (Copies may be obtained from W. M. Murray, Room 1-321, Massachusetts Institute of Technology.)

The eighteen papers presented at the conference are included in this volume. These discuss various applications of the photoelastic method of stress analysis, and some of the results obtained.

Great Britain, Dept. of Scientific and Industrial Research. Water Pollution Research, Technical Paper No. 8. The Treatment and Disposal of Waste Waters from Dairies and Milk Products Factories. His Majesty's Stationery Office, London; British Library of Information, New York, 1941. 125 pp., illus., diagrs., charts, tables, 10×6 in., paper, $1.20.

The results of an intensive investigation of this problem are presented in this report. Methods of reducing the quantity of milk carried away were also investigated. Large-scale experimental plants were constructed, and the results obtained—with the conclusions and recommendations derived from them—are given in this report.

Highway Economics. By H. Tucker and M. C. Leager. International Textbook Co., Scranton (Pa.), 1942. 454 pp., illus., diagrs., charts, maps, tables, $8\frac{1}{2} \times 5$ in., cloth, $4.

A considerable range of topics is covered in this book—from financing methods, in which the subject of taxation is particularly important, to technical discussions of power requirements for and the performance of motor vehicles under varying conditions. Equipment rental, the allocation of highway costs, and traffic and accident considerations are other topics dealt with at some length.

Mechanical Properties of Materials and Design. By J. Marin. McGraw-Hill Book Co., New York and London, 1942. 273 pp., illus., diagrs., charts, tables, $9\frac{1}{2} \times 6$ in., cloth, $3.50.

The primary purpose of this book is to furnish a survey of the mechanical properties of engineering materials and to show how a consideration of these properties modifies design procedure. With this end in view, the author attempts to bridge the gap between books on engineering materials which deal with the manufacture, testing, and properties of materials, and those dealing with the stress analysis of machine and structural members.

Modern Battle, By Maj. Paul W. Thompson. W. W. Norton and Company, Inc., New York, 1942. 221 pp., illus., diagrs., charts, $8\frac{1}{2} \times 5\frac{1}{2}$ in., cloth, $2.75.

This book, the first of its kind to appear in the United States, gives a picture of what goes on during modern battle by describing some of the significant actions in the campaigns from Poland to Crete. It is based on a variety of source material, drawn mainly from European military journals. The book is written in a simple, readable style, supplemented by a special glossary of military terms.

Operation of Water-Treatment Plants. By W. A. Hardenbergh. International Textbook Co., Scranton (Pa.), 1942. 307 pp., illus., diagrs., charts, tables, $7\frac{1}{2} \times 5$ in., cloth, $3.10.

General considerations of water-supply systems, including distribution practice, are first presented. The requirements with respect to quality of water are stated, and analytical methods for the determination of water quality are fully covered. The last half of the book describes details of plant operation and the types of equipment necessary, with a final section containing typical data and records for a rapid sand-filtration plant.

Planned A.R.P., 1st American Edition. By Tecton, Architects. Chemical Publishing Co., New York, 1941. 138 pp., illus., diagrs., tables, $9 \times 5\frac{1}{2}$ in., cloth, $3.50.

This volume presents a plan for the complete protection of the whole population of a city against air raids, by means of large shelters equipped with air-conditioning plant, electric lighting, warden posts, decontamination chambers, etc. The book is based on the investigation of structural protection against air attack in the Metropolitan Borough of Finsbury, England.

(A) Short History of Science to the Nineteenth Century. By C. Singer. Clarendon Press, Oxford, England; Oxford University Press, New York, 1941. 399 pp., diagrs., tables, maps, $9 \times 5\frac{1}{2}$ in., cloth, $3.75.

This elementary survey of the development of knowledge of the material world discusses the emergence of the leading scientific ideas from Greek times to the nineteenth century. Intended for the general reader, scientific problems are treated in the historic order in which they have arisen, rather than along the lines of the separate sciences. An outline sketch is thus provided of the intellectual background of modern classical science.

CURRENT PERIODICAL LITERATURE

Abstracts of Articles on Civil Engineering Subjects from Publications (Except Those of the American Society of Civil Engineers) in this Country and Foreign Lands

Selected items for the current Civil Engineering Group of the Engineering Index Service, 29 West 39th Street, New York, N.Y. Every article indexed is on file in The Engineering Societies Library, one of the leading technical libraries of the world. Some 2,000 technical publications from 40 countries in 20 languages are received by the Library and are read, abstracted, and indexed by trained engineers. With the information given in the items which follow, you may obtain the article from your own file, from your local library, direct from the publisher, or they may be borrowed from the Engineering Societies Library. Photoprints will be supplied by this library at the cost of reproduction, 25 cents per page to members of the Founder Societies (30 cents to all others), plus postage, or technical translations of the complete text may be obtained at cost.

BRIDGES

RAILROAD. Unusual Railway Cantilever Bridge, J. A. Wineland. *Eng. News-Rec.*, vol. 127, no. 21, Nov. 20 1941, pp 718–721. Review of studies carried out by Bureau of Reclamation to determine best type of bridge to carry Great Northern Railway across Columbia River in Washington; design and construction details for cantilever bridge decided upon; unusual feature is that center span is fixed while each end span is made up of cantilever arm and suspended span.

RAILROAD, QUEBEC. Rigid Frame Structure for Subway at St. Hilaire, Que. *Eng. & Contract. Rec.*, vol. 54, no. 22, May 28, 1941, pp. 11 and 22. Details of design of rigid-frame concrete span constructed near St. Hilaire; new bridge will eliminate present level crossing of Canadian National Railway tracks and main highway between Montreal and St. Hyacinthe; structure is made up of rigid-frame span, resting on footings or seats which in turn are carried on concrete piles.

STEEL, WELDING. Design of Welded Bridge, G. T. Horton. *Welding, J.*, vol. 20. no. 12, Dec. 1941, pp. 837–840. Discussion of principles and details of design of typical medium-sized welded highway bridge, with 150-ft span and three panels, for H-20, S-16 loading as specified by Standard Specification for Highway Bridges. Before Am. Welding Soc.

STEEL, WELDING. Welding in Bridge Strengthening, P. B. Bryden. *Inst. Welding Trans.*, vol. 4, no. 4, Oct. 1941, pp. 190–197. Account of experience gained by author in connection with five major bridge-strengthening projects on New Zealand railways during 1932–1938; description of works and design, selection and testing of welders, inspection and costs of operation.

STEEL TRUSS, NATCHEZ-VIDALIA, MISS. Natchez-Vidalia Bridge on Mississippi River. *Engineer*, vol. 172, nos. 4466 and 4467, Aug. 15, 1941, pp. 100–101, and Aug. 22, pp. 114–116. Illustrated description of highway bridge, costing total of $3,735,000; overland section consists of six spans of deck-girder type; total length 4,205.25 ft; main structure made up of five spans of cantilever through-truss type.

BUILDINGS

AIR RAID SHELTERS. Dampness and Condensation in Buildings, with Particular Reference to Air Raid Shelters, F. S. Smith. *Surveyor*, vol. 100, no. 2604, Dec. 19, 1941, pp. 207–208. Reasons for dampness penetrating mortar or surface concrete; remedies cited include application of liquefying solution over entire surface of wall, rendering entire surface in cement and sand, or batten and tile wall affected; suggested means for dampproofing shelters follows usual procedure for any other type building.

CONCRETE. Architectural Concrete Building Construction, H. E. Shudde. *Military Engr.*, vol. 33, no. 192, Oct. 1941, pp. 428–433. Requirements on forms for architectural concrete; material of forms; form ties; planning, detailing, and erection of formwork; wall forms; different types of material for different surface textures; placing concrete, curing, and cleaning.

RECONSTRUCTION. Old Building Strengthened Without Production Loss, H. Bowers. *Eng. & Contract Rec.*, vol. 54, no. 27, July 2, 1941, pp. 10–13 and 36. Complete description of building reconstruction which involved demolishing and renewal of all floor and roof slabs, extension of footings and columns, and addition of new third story; details of soil bearing tests, column strengthening, and strengthening of timbers.

UNDERGROUND PARKING STRUCTURE. Four-Story Underground Parking Space. *Eng. News-Rec.*, vol. 127, no. 21, Nov. 20, 1941, pp. 714–716. Details of concrete structure that will park 1,700 cars; covers area of 275 by 412 ft at depth of 48 ft below street level at Union Square, San Francisco; special analysis necessary because of bulkheading problems; structural frame design and plans for carrying heavy central monument in park above.

CITY AND REGIONAL PLANNING

ESSEN, GERMANY. Air Force Targets in Germany. *Engineer*, vol. 172, no. 4483, Dec. 12, 1941, pp. 416–419. Brief illustrated description of Rhineland town of Essen, with its extensive railway connections, railroad yards, collieries, and steel and engineering works.

CONCRETE

CONSTRUCTION, FORM. Absorptive Form Lining Tests at Friant. *Eng. News-Rec.*, vol. 127, no. 25, Dec. 18, 1941, pp. 884–886. Use of absorptive, fiberboard lining on forms for mass concrete has been studied and developed at Friant Dam to great benefit of surface finish of concrete; need to protect lining from pressure and excessive moisture and from adhesion to concrete is reviewed, based on observation during application of nearly 1,000,000 sq ft of lining.

CURING. Curing Methods as Related to Strength in Concrete, R. L. Lee. *Western Soc. Engrs.—J.*, vol. 46, no. 3, June 1941, pp. 130–143. Description of various curing methods employed, such as those used on concrete roads, in building products, and in other concrete construction work; curing methods employed in manufacture of commercial products such as concrete block, brick, tile, and fence posts are also discussed briefly; methods for testing concrete used in construction work are given.

DRYDOCKS. Drydock Concreting by Belt Conveyor. *Eng. News-Rec.*, vol. 127, no. 21, Nov. 20, 1941, pp. 736–738. Concrete for Navy drydock at San Diego destroyer base is being delivered on system of 24-in. belt conveyors at rates up to 180 cu yd per hour; assembly includes shuttle belts, reversible double-ended belts, and belts on traveling steel bridge; delivery is made by direct drop anywhere in 135 by 720-ft area; uniform loading and thorough cleaning of belts is being accomplished effectively.

HANGARS. Navy Builds Concrete Hangars at San Diego. *Eng. News-Rec.*, vol. 127, no. 23, Dec. 4, 1941, pp. 64–66. Thin-shell barrel-type arch structures are built of four independent sections separated by expansion joints; 2-hinged arch ribs on outside of barrel, two to each section, have footings supported on piles and tied together by bridge strands; using movable timber forms hangar roof section was completed every $2^1/_2$ to 3 weeks, concrete being supplied by pump line from mixer on ground.

MIXING, DISPERSION. Cement Dispersion and Concrete Quality, E. W. Scripture, Jr. *Eng. News-Rec.*, vol. 127, no. 23, Dec. 4, 1941, pp. 82–85; see also *Military Engr.*, vol. 33, no. 194, Dec. 1941, p. 571. Making cement in concrete mix more effective is purpose of dispersing agents; by this action, clumps of cement are separated into individual particles, thus presenting greater surface area for hydration and requiring smaller amount of water for given consistency; dispersion is related to economy by making concrete more placeable, and by improving its durability and strength.

ROADS AND STREETS. New Strength Design for Concrete Pavement Mix, V. J. Brown. *Roads & Streets*, vol. 84, no. 10, Oct. 1941, pp. 25–35. Review of design and construction procedure used in Texas, most important feature of which is field control; controls for concrete paving; design of mixtures; strength design procedure used on U.S. 81, north of Austin, Tex., described in supplementary article entitled "Paving Contractor Profits by Texas Strength Design."

ROOFS. Constructional Methods on Barre Roofs. *Concrete & Constr. Eng.*, vol. 36, no. 10, Oct. 1941, pp. 389–393. Description of methods of placing concrete in curved roofs, developed by Corbetta Construction Co., New York, contractors for number of large storage warehouses now being erected for U.S. Army; each structure is 182 ft wide by 1,562 ft long and has reinforced concrete frame carrying thin-barrel arched roofs and side walls of hollow bricks; roof is made up of four "arches" of 45-ft span running longitudinally.

SAND AND GRAVEL PLANTS, SOUTH CAROLINA. Gravel for "Porous" Concrete. *Rock Products*, vol. 44, no. 12, Dec. 1941, pp. 38–40 and 42. Description of plant and practice of Becker County Sand and Gravel Co. at Cheraw, S.C., with contract for furnishing aggregates for Santee-Cooper Power and Navigation Project in southeastern South Carolina, about 50 miles from Charleston; difficult specifications are met, for gravel in three sizes.

VIADUCTS. Travelling Falsework for Arches on Curves, K. A. Sheppard. *Concrete & Constr. Eng.*, vol. 36, no. 10, Oct. 1941, pp. 417–420. Notes on methods of construction of approaches for George Washington Bridge.

WATERPROOFING. Waterproofing of Concrete Structures, J. F. Cameron. *Can. Min. J.*, vol. 62, no. 12, Dec. 1941, pp. 834–835. Brief general commentary; integral method of waterproofing is most satisfactory, because it waterproofs logically and positively by breaking down capillary attraction; characteristics of three general types of integral waterproofing; stearates are superior; calcium chloride type; plasticizer type; suggestions as to where to use waterproofing.

DAMS

ARCH MEXICO. Mexico Builds High Arch Dam on Yaqui River. *Eng. News.-Rec.*, vol. 127, no. 21, Nov. 20, 1941, pp. 734–735. Angostura Dam, 291-ft high arch dam on tributary of Yaqui River, was completed late in 1940 by Mexican National Commission of Irrigation; structure is first of series of irrigation and power dams for development of large river basin in state of Sonora; American methods and equipment were used.

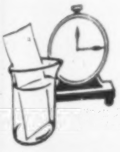
BUTTRESS, ARGENTINA. Buttress Dam at San Felipe, Argentina, *Engineer*, vol. 172, no. 4474, Oct. 10, 1941, pp. 233–235. Illustrated description of dam built with view to regulating overflows of River Conlara, Province of San Luis, so as to improve irrigation of valley; main dam consists in its central section of reinforced concrete buttress dam of Ambursen type; maximum length is 220 m and maximum height 25.50 m.

CONCRETE, ONTARIO. Shand Dam, M. Pequegnat. *Eng. & Contract Rec.*, vol. 54, no. 50, Dec. 10, 1941, pp. 8–11, 18–19, and 22–23. History of preliminary planning and surveys concerning Grand River conservation scheme considered principally for flood prevention; notes on design and construction of Shand Dam which is first unit of extensive project.

EARTH, AUSTRALIA. Design of Samson Brook and Stirling Dams, Western Australia, R. J. Dumas and R. A. Macbeth. *Instn. Engrs. Australia—J.*, vol. 13, no. 10, Oct. 1941, pp. 231–239. Paper describes design and some construction details of two high earthen dams in southwestern portion of western Australia, which are being built to augment water supply available for irrigation districts, thus enabling extensions of areas to be made.

HYDRAULIC FILL, MASSACHUSETTS. Hydraulic Fill at Knightville Dam, W. L. Maschmeyer. *Eng. News-Rec.*, vol. 127, no. 23, Dec. 4, 1941, pp. 86–90. Knightville Dam, first of series for control of floods in Connecticut River, was built by hydraulic-fill methods under careful engineering control that resulted in close approximation to theoretically correct distribution of material in dam; details of method of construction and control of materials are given.

RAILROAD TRACKS, RELOCATION. Federal Dam Projects Require Many Railroad Relocations. *Ry. Age*, vol. 111, no. 26, Dec. 27, 1941, pp. 1073–1077. Flood control program being



PHOENIX DEFIES MOISTURE GHOSTS . . .

Your hands are never dry. Perspiration stains ordinary tracing cloth, producing opaque spots, or "ghosts," that show on blueprints. Water splashes make even more disagreeable stains.

PHOENIX *Tracing Cloth withstands actual immersion in water for more than 10 minutes at a time without ill effects!* Perspiration will not stain it!

PHOENIX LESSENS SMUDGE GHOSTS . . .

The improved surface of PHOENIX Tracing Cloth permits you to use harder pencils (5H and 6H) and to get sharper lines with less tendency to smudge.

Result: cleaner tracings and blueprints!

PHOENIX REDUCES ERASURE GHOSTS . . .

Ordinary tracing cloths become scarred when erased. Erased spots produce ghosts on the blueprints.

PHOENIX has a durable drawing surface that reduces working scars to a minimum.

THIS NEW TRACING CLOTH *IS*

GHOST-PROOF!

Here is a new kind of tracing cloth that won't show perspiration stains or water marks—*that holds pencil smudges and erasure scars at a minimum.* Now you can have clean tracings, in pencil or ink, free from these untidy "ghosts" that reproduce on blueprints!

For PHOENIX is ghost-proofed by a remarkable new process that defies moisture, and gives you an unusually durable working surface. You can use harder pencils with this improved cloth and get sharper lines with less tendency to smudge. Even 6H pencil lines show clearly, and reproduce sharply! Erasing does not mar the drawing surface; erased areas take pencil smoothly—and ink without feathering. The new white color and increased transparency provide excellent drawing contrast and produce strong blueprints.

Try PHOENIX for yourself on your own drawing board. See your K&E dealer or write for a generous working sample and an illustrated brochure.

K&E
Phoenix
REG. U.S. PAT. OFF.
TRACING CLOTH
for pencil and ink

EST. 1867
KEUFFEL & ESSER CO.
NEW YORK • HOBOKEN, N. J.
CHICAGO • ST. LOUIS • SAN FRANCISCO • LOS ANGELES • DETROIT • MONTREAL

carried on by government has necessitated relocation of several hundred miles of railroad lines; new problems created for engineering departments of railroads in this connection, are discussed.

Steel, New South Wales. Corrugated Sheet-Steel Catenary Dam. *Engineering,* vol. 152 no. 3957, Nov. 14, 1941, pp. 387 and 390. Illustrated description of dam constructed by E. Giles Stone at his works at Narrabeen, New South Wales; made of semi-cylindrical corrugated steel sheets curved away from water flow; sheets are thus in tension and load-carrying principle is analogous to that of suspension bridge; hence, use of term "catenary"; buttresses are tied together by crest of dam; main reason for new design is to enable water to be conserved at low cost.

FLOOD CONTROL

Effects of Storms. Big Waters on Little Streams, A. S. Fry. *Agric. Eng.,* vol. 22, no. 12, Dec. 1941, pp. 424–426. To illustrate characteristics of storms and resulting flood runoff and damages, three storms that occurred in mountainous valleys of Appalachians in western North Carolina and eastern Tennessee, are discussed as to effect on mountain watersheds of less than 100 sq miles; summer storms often accompanied by huge slides of material from mountain sides; understanding of phenomena is prerequisite to appreciation of flood problems in valleys. Before Am. Soc. Agric. Engrs.

FLOW OF FLUIDS

Soils, Physics. Hydraulics of Water in Unsaturated Soil, L. A. Richards. *Agric. Eng.,* vol. 22, no. 9, Sept. 1941, pp. 325–326. Problems on flow and distribution of water in soil can be simplified if principles and concepts of hydraulics are applied; commonly used types of gages or manometers can be employed for measuring pressure in water in unsaturated soil, providing suitable porous medium is used for connecting water in measuring device to water in soil; examples given.

FOUNDATIONS

Caissons, Steel. Open Steel Caissons for Cast-in-Place Piles, G. B. Sowers. *Eng. News-Rec.,* vol. 127, no. 21, Nov. 20, 1941, p. 717. Illustrated description of construction of 193 cast-in-place piles, of 36-in. diameter and averaging 52 ft in length for unique foundation for large grain elevator at Buffalo, N.Y.

Cofferdams, Design. Cofferdam Design for Kentucky Dam, A. F. Hedman. *Eng. News-Rec.,* vol. 128, no. 1, Jan. 1, 1942, pp. 30–34. Construction of first stage of Kentucky Dam near mouth of Tennessee River requires one of largest sheetpile cellular cofferdams ever built; 2,900 ft long and 50 ft high; design of cofferdam was based on thorough analysis of all conditions and soil studies; plan finally adopted consists of shore arms of 60-ft diameter, circular cells, and river wall of 90 by 100-ft cloverleaf cells, using 19,500 tons of sheeting.

Piles, Driving. More Dependable Pile-Driving Formula, W. H. Rabe. *Eng. News-Rec.,* vol. 127, no. 25, Dec. 18, 1941, pp. 892–895. Because of wide variations between indicated bearing capacity for piles driven for bridges in Ohio and actual bearing capacity as shown by tests, author undertook to develop simple formula that would give more consistent results than those obtained with formulas now used by Department of Highways; results of his studies to date are given for purpose of stimulating discussion of new formula and possible modifications of it.

Piles, Wooden, Preservation. Timber Pile Preservation, T. H. Hansen. *Dock & Harbour Authority,* vol. 21, no. 252, Oct. 1941, pp. 258–260. Details pertaining to method of treatment for timber piles in sea water known as Toxic Refill Method; information relating to tests on piles in Trinidad waters; description of treatment and its effects given.

HYDRAULIC ENGINEERING

Laboratories, Equipment. Appurtenances for Open Channel Hydraulics Models—Pt. 1, C. E. S. Bardsley. *Okla. Agric. & Mech. College—Eng. Experiment Station—Publ. no. 48,* vol. 11, no. 5, Feb. 1941, 20 pp., supp. plate. Description of appurtenances peculiar to open channel hydraulics laboratory; methods of measuring cross section of movable bed model; appurtenances for glass-sided flume; wave making appurtenances; portable classroom laboratory.

HYDROLOGY AND METEOROLOGY

Earthquakes, New Zealand. Earthquake Origins in New Zealand Region, R. C. Hayes. *New Zealand J. Science & Technology,* vol. 22, no. 58, Mar. 1941, pp. 225–230. Map is presented showing revised earthquake origins in New Zealand region for years 1931 and 1936 to 1940, inclusive; methods of determining epicentres and focal depths are briefly outlined; attention is drawn to certain regions where shocks frequently originate at depths below normal, and in particular to zone of deep focus shocks which traverses part of North Island.

Runoff. Design of Plot Experiments for Measurement of Run-Off and Erosion, A. E. Brandt. *Agric. Eng.,* vol. 22, no. 12, Dec. 1941, pp. 429–432 and 436. Article shows how critical experimentation can be done and why designs used achieve desired ends; in all adequate designs, purpose is to determine difference of effect and to provide valid estimate of variability of effects of treatments on same plot, experimental and random errors, sampling error or just error; selection of definite kind essential in designing runoff plot experiment. Before Am. Soc. Agric. Engrs.

MATERIALS TESTING

Concrete. Resistance to Combined Flexure and Compression of Square Concrete Sections, P. Andersen. *Minn. Univ.—Eng. Experiment Station—Tech. Paper,* no. 29, 1941, 27 pp. Object of investigation reported is to supplement existing experiments, reinforced concrete specifications include variable concrete working stress for eccentrically loaded columns; main factor of present study deals with resistance of square sections as influenced by eccentricity in two directions.

Concrete. Strength of Cement-Lime Mortars and Concretes, W. F. Cassie. *Engineering,* vol. 152, no. 3953, Oct. 17, 1941, pp. 301–303. Results over four series of tests point to conclusion that strength of cement-lime mortar or concrete must be estimated from its cement and water content; any increase in strength of concrete, which has been attributed to presence of lime, is due to other causes (e.g., water content) and lime acts as inert filler, beneficial in several ways, but not contributing to strength of mix.

Explosives. Shelters for Ammunition-Proving Ground. *Engineering,* vol. 152, no. 3954, Oct. 24, 1941, p. 336. In order to study explosive effects of new types of ammunition, U.S. War Department has constructed series of reinforced concrete bomb-proof shelters on Jefferson Proving Ground, Madison, Ind.; occupied by observers who, from them, are able to witness, and report on, difference in destructive qualities of explosives being produced by new Army Ordnance Plants; brief illustrated description.

Pipe, Concrete. Army Witnesses Test of Concrete Pipe, R. S. Torgerson. *Rock Products,* vol. 44, no. 12, Dec. 1941, pp. 68 and 70. Description of test of concrete pipe without reinforcement, made by Sherman Concrete Pipe Co., Nashville, Tenn.; test was made to determine behavior of concrete pipe in a trench back-filled with crushed stone when subjected to loading, simulating conditions such as those encountered in airport drainage.

PORTS AND MARITIME STRUCTURES

Karlsruhe, Germany. Air Force Targets in Germany. *Engineer,* vol. 172, no. 4479, Nov. 14, 1941, pp. 326–327. Brief illustrated description of city of Karlsruhe and Rhine harbor; railroad facilities.

ROADS AND STREETS

Airport Runways. Airport Uses Highway Design. *Roads & Streets,* vol. 84, no. 9, Sept. 1941, pp. 29–33. Airport of Selma Advanced Flying School comprises about 2,000 acres of sandy loam soil with red clay subsoil; Alabama cross-section standards were adopted for runways and aprons; particulars of soil preparation and construction work given.

Airport Runways. Nine Day Soil-Cement Job, E. A. Bonfield. *Excavating Engr.,* vol. 35, no. 12, Dec. 1941, pp. 678–679. Particulars of continuous production system designed to keep every piece of equipment busy during construction of smooth apron 1,600 ft long and 400 ft wide with 1,200 tie-down anchors in place at U.S. Army Airport at Windsor Locks, Conn.

Airport Runways. Paving Methods at Eastern Airbase. *Eng. News-Rec.,* vol. 128, no. 1, Jan. 1, 1942, pp. 12–13. Outline of methods and work done in two major contracts—one consisted of 175,000 sq yd in aprons and taxiways in front of hangars, and other of 288,000 sq yd in 5,400-ft and 5,000-ft runways and 2,000-ft extension to existing 5,000-ft runway, all 150 ft wide, to give ample room for maneuvering big bombers; operations involved many short "runs," resulting in development of stone-boat for moving heavy finishing machines.

Airport Runways. Soil-Cement Runways for Large Army Airport. *Eng. New-Rec.,* vol. 128, no. 1, Jan. 1, 1942, pp. 38–40. Outline of construction procedure for soil-cement paving, used in conjunction with reinforced-concrete center strips, gutters, aprons, and taxiways of airport surfacing on Army airport in Middle West; soil-cement surfacing 7 in. thick, is heaviest yet used for this type.

Airport Runways. Stabilization of Gravel Runways on Washington National Airport, A. Aaron. *Pub. Roads,* vol. 22, no. 8, Oct. 1941, pp. 167–182 and 191–192. Report covers participation of Public Roads Administration in stabilization of gravel runways at airport; runways varying in length from 4,200 to 6,875 ft and surfaced with $3^1/_2$ in. of bituminous concrete on stabilized gravel base 9 in. thick, are located almost entirely on what was originally shoal water and mud flats; work of stabilization described in detail.

Airports, Fort Wayne, Ind. Fort Wayne's New Airport, F. L. Spangler. *Roads & Streets,* vol. 84, no. 10, Oct. 1941, pp. 48, 50, 52, 54, and 58. Details of concrete and soil-cement runways built on carefully prepared subgrade; runways are 300 ft wide and consist of 100-ft concrete center strip with 88-ft strip of soil cement on each side and 12-ft concrete surface, gutter, and curb along each outside edge.

Asphalt. Determining Thickness of Asphalt Pavement with Reference to Subgrade Support, P. Hubbard and F. C. Field. *Eng. & Contract. Rec.,* vol. 54, no. 33, Aug. 13, 1941, pp. 18–20 and 26. Method described is based upon actual tests and observation of behavior of asphalt pavements resting directly upon soil masses; failures due to inadequate subgrades; load supporting capacity of soil with reference to asphalt pavement; load-supporting capacity of asphalt pavement with reference to its subgrade support; relation of proposed method to other standards of evaluation.

Binders. Lignin Binder Used in Test Sections Subjected to Accelerated Traffic, E. A. Willis. *Pub. Roads,* vol. 22, no. 8, Oct. 1941, pp. 183–188 and 190–191. Report of investigation in which crusher-run limestone, granite, slag, and gravel were mixed with binder soil and tested in outdoor circular track; application of lignin binder at rate of $^1/_2$ gal per sq yd retarded raveling as compared with tests on untreated sections; all sections gave good performance when tested under normal conditions of moisture as base courses for thin bituminous surfaces.

Charleston, W. Va. Kanawha Boulevard at Charleston Extended, W. Brewster. *Eng. News-Rec.,* vol. 127, no. 23, Dec. 4, 1941, pp. 67–69. By extension of Kanawha Boulevard upstream along Kanawha River at Charleston, W.Va., two dangerous grade crossings have been eliminated on U.S. Highway 60; on new route, 18-ft bituminous surfaced roadway on crooked alinement is replaced by two 22-ft roadways separated by 3-ft wide mall; for new highway, earth and rock embankment was placed along river bank with rock toe wall built up to 2 ft above normal pool level.

Construction. Quebec's Contribution to Highway Construction Techniques, E. H. Gohier. *Eng. & Contract. Rec.,* vol. 54, no. 48, Nov. 26, 1941, pp. 6–9 and 18–19. Illustrated description of construction methods employed in Quebec; express highways; subgrade treatment; mix design; proportioning; reinforcing; finishing; asphalt; road-mixed bituminous concrete pavements; plant-mixed bituminous carpets; stone-filled sheet asphalt surface course; stabilization; soil graded aggregate with copacite; construction process, etc.

Elevated. Report of Committee on Elevated Highways. *Am. Road Bldrs.' Assn.–Bul.,* no. 74, 1941, 24 pp. Information on design and construction of elevated highways; it is concluded that elevated (on columns) type of superhighways when split lengthwise into three units (one for incoming traffic, one for outgoing traffic, and one reversible in direction of its traffic at certain times of day) is by far best type for use through built-up areas of typical or near-typical big city.

Expressways and Parkways, New York City. Cantilever Steel Bents on Pipe Pile Foundations Carry Elevated Highway. *Construction Methods,* vol. 23, no. 12, Dec. 1941, pp. 42–43, 46, 87–88, and 90–93, additional photographs pp. 44–45. Photographs and description of designs of cantilever steel bents used on superstructures of various sections of elevations of Belt Parkway.

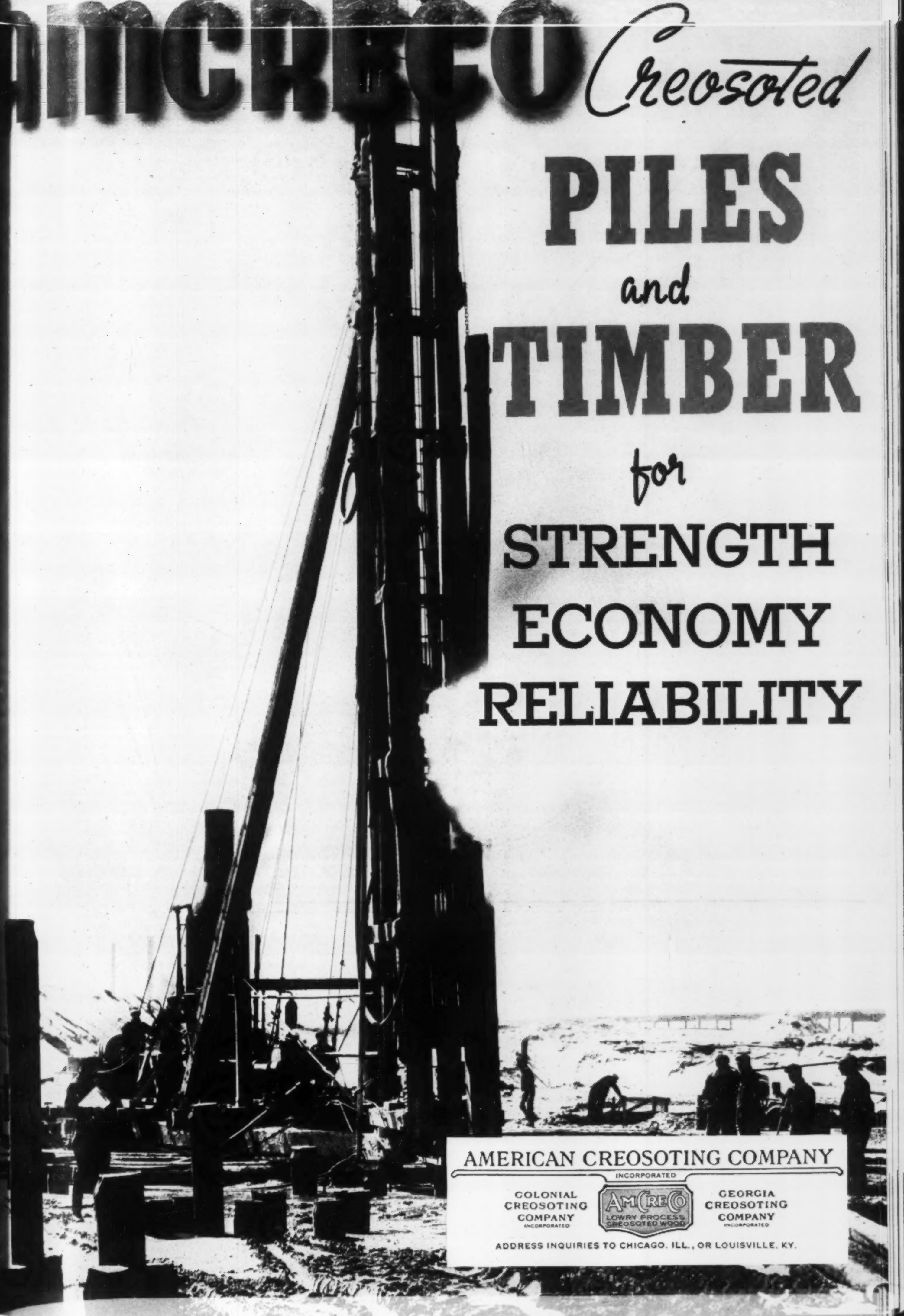
Highway Engineering, Research. Soil Stabilization and Maintenance Considered at Highway Meeting. *Eng. News-Rec.,* vol. 128, no. 1, Jan. 1, 1942, pp. 35–37. Summaries of papers and committee reports at annual meeting of Highway Research Board include soil stabilization studies, maintenance of highway surfaces and bases, and record keeping.

Highway Systems, Alaska. Alaskan International Highway. *Engineering,* vol. 152, no 3958, Nov. 21, 1941, p. 412. Discussion of project for construction of highway linking United States with Alaska; Alaskan International Highway Commission, made up of representatives of United States and Canada, has recommended that such road should be put in hand at once; it estimates that road could be completed in 2 years.

Highway Systems, Inter-American. Linking Americas by Highway. *Highway Mag.,* vol. 32, Sept. 1941, pp. 196–199. Importance of Inter-American highway as hemisphere defense item now overshadows tourist, commercial, and cultural advantages; route now passable for three-quarters of its 16,000-mile length.

Highway Systems, Pan-America. El sistema Vial Panamericano, G. E. Valderrama. *Sociedad de Ingenieros del Peru—Informaciones y Memorias,* vol. 42, no. 7, July 1941, pp. 265–272. Pan-American highway system; author urges reciprocal technical knowledge and necessity for cooperation between American nations, to promote rapid completion of Pan-American highway; antecedents; present status in Peru, Bolivia, and Argentina; steps necessary to achieve fundamental project.

Joints. Joints for Concrete Roads and Large Type Pavements, T. R. Grigson. *Surveyor,* vol. 100, no. 2599, Nov. 14, 1941, pp. 163–165. Classification of joints according to stresses they are



AMCRECO *Creosoted*

PILES

and

TIMBER

for

STRENGTH
ECONOMY
RELIABILITY

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED

AMCRECO LOWRY PROCESS CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY INCORPORATED

ADDRESS INQUIRIES TO CHICAGO, ILL., OR LOUISVILLE, KY.

intended to relieve; expansion and contraction due to change of temperature and changes in moisture; types of joints to permit warping; dowelled transverse joints, aggregate interlock, and joints of tongue and groove type discussed.

Road Machinery. 2-in-1 Machine Spreads and Finishes Bituminous Surfacing. *Construction Methods*, vol. 23, no. 12, Dec. 1941, pp. 47, and 100. Description of combination spreader-finisher of new design, developed particularly for application of bituminous surfacing to roads, was used effectively in resurfacing in 20-ft lanes, existing 40-ft wide concrete highway west of Park Ridge, Ill.

Snow and Ice Control. Skidproofing Icy Roads and Streets. Calcium Chloride in Ice Control Practice. *Calcium Chloride Assn.—Bul.*, no. 27, 1941, 33 pp. Data reported on ice control practice of highway engineering organizations; calcium chloride treatment; spreading rate and effectiveness, placement and storage of abrasives, and ice removal methods discussed.

Snow Removal. Municipal Snow Removal. *Roads & Streets*, vol. 84, no. 9, Sept. 1941, pp. 60-62, and 65-66. Discussion of problems confronting average city; outline of plan and organization for snow fighting; arrangements for personnel; methods of removing snow and ice; eliminating icy conditions; interference of parked cars; measurement of snow and ice removal work.

Subsoils. Road Foundations—Soil Mechanics, T. R. Grigson. *Surveyor*, vol. 100, no. 2601, Nov. 28, 1941, pp. 179-180. Discussion of bearing power of soil as related to each of following characteristics: liquid limit, plastic limit, plasticity index, shrinkage limit, centrifugal moisture equivalent, field moisture equivalent, lineal shrinkage, and volumetric shrinkage.

Widening. Low-Cost Road Widening Method Assists Increased Wartime Traffic. *Eng. & Contract. Rec.*, vol. 54, no. 33, Aug. 13, 1941, pp. 24 and 26. Quick, low-cost method of widening existing highways for increased war-time traffic is presented; design and pavement thickness are shown in sectional drawing illustrating crusher screenings insulation course, dry choked stone, slag or gravel sub-base, asphaltic concrete base course, and asphaltic concrete surface course.

SANITARY ENGINEERING

Municipal Problems. Municipal Sanitary Problems, R. Cyr. *Eng. & Contract. Rec.*, vol. 54, no. 32, Aug. 6, 1941, pp. 16-18. Discussion of sanitary problems encountered in typical Canadian towns including improvements obtained from municipalities and institutions concerning water treatment, extensions to water and sewerage systems, and school problems, especially in relation to ventilation.

SEWERAGE AND SEWAGE DISPOSAL

Activated Sludge. Some Investigations into Digestion and Drying of Humus and Activated Sludges, C. Lumb. *Surveyor*, vol. 100, no. 2602, Dec. 5, 1941, pp. 191-192. Study of behavior of humus and activated sludges in anaerobic digestion at various temperatures; digestion at lower temperatures requires longer time and larger tank capacity than primary tank sludge; thermophilically digested sludges are not amenable to dewatering by mechanical means. Bibliography. Before Inst. Sewage Purification.

Corrosion. Corrosion Around Sewage Treatment Plants. *Sewage Works Eng. & Mun. Sanitation*, vol. 12, no. 9, Sept. 1941, pp. 485-458. Review of troubles experienced by various operators regarding corrosive action on metal and nonmetallic surfaces, buildings, and equipment; protective treatments employed.

Gas Recovery. Power Generation from Sewage Gas, W. A. Sperry. *Eng. & Contract. Rec.*, vol. 54, no. 32, Aug. 6, 1941, pp. 10-15 and 22. Details of sewage plant at Aurora, Ill., using sewage gas as fuel for sewage pump engines; sewage treatment processes described; separate sludge digestion and gas utilization systems; composition, production, and use of gas; advantages of manufacturers power; notes on engine room; discussion of corrosion problems.

Grease Removal. Handling Tank Skimmings and Grease. *Sewage Works Eng. & Mun. Sanitation*, vol. 12, no. 10, Oct. 1941, pp. 557 and 567-569. Review of practices with regard to collection and disposal of screenings and grease and methods employed for final disposal of these materials.

Industrial. New System of Treatment of Sewage and Trade Effluents, A. Parker. *Surveyor*, vol. 100, no. 2603, Dec. 12, 1941, p. 199. Alternating double filtration process described. Method consists of operation of percolating filters to bring about biological purification of sewage and trade wastes, and thus reduce their polluting effect on river or stream into which liquids may be discharged.

Pumping Plants. Pumping Sewage, Sludge and Chemicals. *Sewage Works Eng. & Mun. Sanitation*, vol. 12, no. 11, Nov. 1941, pp. 615-616. Discussion by sewage plant superintendents and operators on types of pumps used for pumping sewage, sludge, and chemicals.

Sewage Disposal. Current Developments and Trends in Sewage Treatment, A. J. Fisher. *Civ. Eng. (London)*, vol. 36, no. 424, Oct. 1941, pp. 592-595. Evaluation of past and current developments and their effect on future trends in sewage treatment. Before Calif. Sewage Works Assn.

Sludge. Review of Sewage Sludge Disposal Problem, W. L. Malcolm. *Eng. & Contract. Rec.*, vol. 54, nos. 46 and 49, Nov. 12, 1941, pp. 14-15 and 20-21, and Dec. 3, pp. 15-17. Review of sludge-disposal problems; particles in suspension; grit; plain sedimentation; chemical precipitation; activated sludge; percolating and trickling filters; digestion methods; disposal of sludge; dewatering-primary drying-vacuum filtration; elutriation or washing; dewatering-primary drying-sand beds; dewatering secondary drying; incineration.

STRUCTURAL ENGINEERING

Beams, Deflection. Flexure of Continuous Beams and Beams with Fixed Ends, A. L. Egan. *Engineering*, vol. 152, no. 3955, Oct. 31, 1941, pp. 341-342. It is claimed that method given will solve most complicated problem in manner that is easy to understand and apply; it is based on fact that analysis of slopes at supports provides simple and logical solution to beam problems.

Framed Structures, Wooden. Industrial Plant Adopts Timber Frame Construction. *Eng. & Contract. Rec.*, vol. 54, no. 20, May 14, 1941, pp. 12-13. Preservative treatment applied to materials on job in building Way Sagless Spring Co. Plant, Toronto; main feature of design is that interior framework is, except for one large steel girder, entirely of timber and wood.

Structural Design. Correct Design of Rigid Structures, O. Gottschalk. *Franklin Inst.—J.*, vol. 232, no. 6, Dec. 1941, pp. 553-578. Correct statical calculation of buildings is being done in two strictly separate steps: Analysis of structure and computation of stresses produced by loads. Structural analysis is strictly geometrical operation, based upon equations and applied in accordance with conditions of equilibrium and geometrical relations in deformed models, as illustrated in this paper.

Walls, Brick. Brickwork as Seen by Engineer, E. E. Seelye. *Eng. News-Rec.*, vol. 127, no. 21, Nov. 20, 1941, pp. 724-729. Details of methods for proportioning brickwall; specific design questions include girder concentrations, wall stability, effect of buttresses, and pier dimentions; new method of proportioning lintels and "hybrid" steel-frame construction are described.

SURVEYING

Aerial Surveying. Locating Highways from Air. *Eng. & Contract. Rec.*, vol. 54, no. 18, Apr. 30, 1941, pp. 10-13. Method developed by Ontario Department of Highways and applied to Queen Elizabeth Way and Hearst-Geraldton Highway consists of series of overlapping photographs of area to be studied, taken from uniform predetermined height, and of vertical projection; use of epidiascope described.

TUNNELS

Water Supply, Lining. Lining World's Longest Tunnel. *Eng. News-Rec.*, vol. 127, no. 23, Dec. 4, 1941, pp. 70-75. Lining 85 miles of tunnel for New York City's Delaware water supply system has assembled on one line most advanced methods and equipment so far devised for forming and placing concrete tunnel lining; telescoping forms and continuous pours of concrete, part of which is mixed in tunnel by double drum pavers.

WATER PUMPING PLANTS

Switzerland. Drinking Water for Large Plateau 3,300 Ft. Above Sea Level, Supplied from Subsoil Stream Situated 1,650 Ft Lower. *Sulzer Tech. Rev.*, no. 2, 1941, pp. 1-10. Description of plant, featuring following: subsoil water is collected in two wells, delivered from there by low-lift pumps to daily service tank with capacity of 44,000 gal; high lift pumping stations, each with two pumps, deliver water in high level reservoir of 330,000-gal capacity, situated 1,770 ft above pumping station; from there it passes into distributing system of mains.

WATER TREATMENT

Chlorination. Emergency Conditions in Water Chlorination, A. E. Berry. *Eng. & Contract. Rec.*, vol. 54, no. 30, July 23, 1941, pp. 52-53 and 76. In view of fact that pollution of water may occur at any time, author outlines suggested means to meet emergency; water works operator should provide duplicate chlorination equipment, also sufficient equipment to meet maximum fire demand and highest chlorine demand of water; portable equipment for dealing with sabotage, floods, and cross connections.

Water Supply, New York. New York's Water Supply, R. Hammond. *Civ. Eng.* (London), vol. 36, no. 418, Apr. 1941, pp. 433-436. Description of work carried out in construction of tunnels of New York City water supply; Delaware Aqueduct project is remarkable in that it is pressure tunnel 85 miles in length, circular in section, and lined with concrete, located at depth which varies from 300 to 1,000 ft below ground level; deep tunneling problems covered.

Water Supply, New York. Overcoming Underground Difficulties, F. W. Stiefel. *Compressed Air Mag.*, vol. 46, no. 12, Dec. 1941, pp. 6607-6614. Descriptive notes, dealing with operations on Contract 313 of Delaware Aqueduct covering nearly one-third of 44.6 miles of tunnel between Rondout Reservoir and West Branch Reservoir of Board of Water Supply of New York City.

Water Supply, North Carolina. Construction of Charleston's Edisto-Goose Creek Tunnel, J. E. Gibson. *Pub. Works*, vol. 72, no. 11, Nov. 1941, pp. 15-16 and 35-37. Methods employed in constructing 23 miles of 7-ft tunnel; tunnel is of modified horseshoe shape, with total fall of 18 ft in 23.1 miles; capacity by gravity is 55 mgd, which can be increased to 75 mgd by pumping outlet shaft down to elevation −13; it is unlined, inspection of first 4 1/2 miles after over 7 years of use having shown no deterioration, with less than half-yard of material sloughed off surface for entire length. Before New England Water Works Assn.

WATER PIPE LINES

Concrete. Seven Miles of Lock Joint Pipe at Portland, Me., Laid in Severe Winter Weather, H. U. Fuller. *Pub. Works*, vol. 72, no. 6, June 1941, pp. 15-17. Detailed description of project: rock excavation, venturi meter, 30-in. pipe, testing and chlorinating, cross connections, and quantities.

WATER RESOURCES

Water Supply, Underground. Control of Underground Water—Discussion of Subdrainage Practice, M. J. Adams. *Pub. Works*, vol. 72, nos. 11 and 12, Nov. 1941, pp. 23-24, 26, and 28-29, and Dec., pp. 24-27 and 41. Fundamental principles and effective details of design and construction learned by examination of large number of failed subdrains; location of drains; pervious backfill.

Watersheds. Sanitation, Maintenance and Control of Watersheds, F. H. Whitley. *Pub. Works*, vol. 72, no. 8, Aug. 1941, pp. 17-38. Sources of pollution and methods of eliminating or counter-acting them; recreational use of reservoirs; sanitary facilities for occupants of watersheds; policing and patrolling; reforestation; mosquito control.

WATER TREATMENT

Alton, Ill. Treating Mississippi River Water, H. S. Molter and R. L. Tacker. *Water Works Eng.*, vol. 94, no. 22, Oct. 22, 1941, pp. 1324-1326 and 1345. Description of water treatment and softening plant supplying water to domestic and industrial population of about 40,000; details of settling basins of unusual design which have individual capacity of 1.25 mgd.

WATER WORKS ENGINEERING

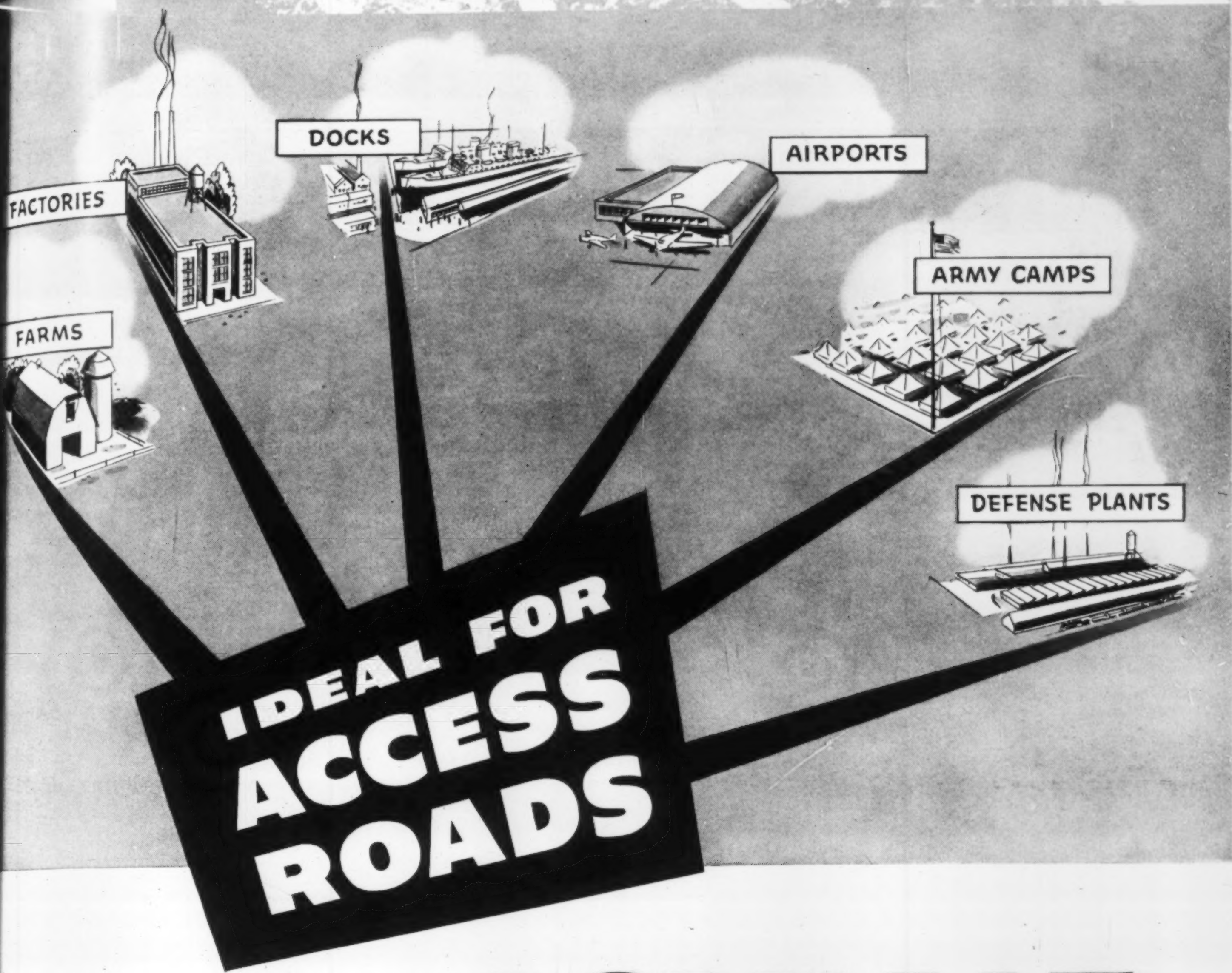
Water Tower, Fort Bragg. Construction of Fort Bragg Water Tower, J. W. Macdonald. *Constructor*, vol. 23, no. 9, Sept. 1941, pp. 31-32 and 33. Construction details of water tank 70 ft in diameter, 35 ft deep with walls 12 in. thick, which rests on substructure consisting of three concentric concrete rings 85 ft high; tank will store 1,000,000 gal to supply water demand for all purposes to camp, housing 60,000 men.

Water Wells, Australia. Boring for Water—New South Wales Government Scheme, H. H. Dare. *Commonwealth Engr.*, vol. 29, no. 3, Oct. 1, 1941, pp. 59-63. New South Wales scheme described is most extensive in Commonwealth; expenditure has reached approximately £1,000,000; source of water; description of shallow boring scheme; regulations; boring plants; bores sunk by private contractors; casing; nature of formation; cooperation with department of mines; use of divining rod; cost to settler.

Water Wells, Cleaning. Acid Treatment for Wells. *Water Works Eng.*, vol. 94, no. 26, Dec. 17, 1941, pp. 1560 and 1570. Analysis of types of incrustation that can be treated successfully by single and double acid treatment; use of compressed or "dry ice" as medium for final surging and cleaning well.

Water Wells, Danville, Pa. Constructing Concrete Wells in Susquehanna River, L. Deitrick. *Pub. Works*, vol. 72, no. 5, May 1941, pp. 19-20. Procedure used at Danville, Pa., in construction of concrete wells, to replace old cast-iron ones; wells receive water from river which has filtered through several feet of sandy river bed; river turbidity of 4,000 is reduced to 40.

West Virginia. West Virginia's Story of Its Fight for Competent Plant Operation, J. B. Harrington. *Water Works Eng.*, vol. 94, no. 25, Dec. 3, 1941, pp. 1494-1496. History of public water supplies in West Virginia and records of outbreaks of typhoid fever due to lack of proper water purification; reasons and procedure of licensing operators given; benefits of licensing to state, city, or company and to operator himself.



STANDARD OIL ASPHALT

• Highway traffic is the blood stream of the victory production program. Miles of improved, widened, and new highways are needed to link together the food and material production centers, defense plants, army camps, and airports. Asphalt construction provides a means of supplying these vital arteries of industry now, when they are needed, because:

- **Asphalt** requires the minimum amount of time between the start of the paving job and the final load-carrying finish.
- **Asphalt** roadways can frequently be built with local aggregate. A big saving in transportation time and expense.
- **Asphalt** construction requires only equipment that is readily available.
- **Asphalt** surfaces can be quickly restored to service when damaged, even if by enemy bombs!

Wherever Standard Oil Asphalt products are sold, there is a Standard Asphalt Representative who can give you full information about its application to your problem. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the representative nearest you.

OIL IS AMMUNITION — USE IT WISELY

Copyright 1942, Standard Oil Co. (Indiana)

ASPHALT FOR EVERY PURPOSE

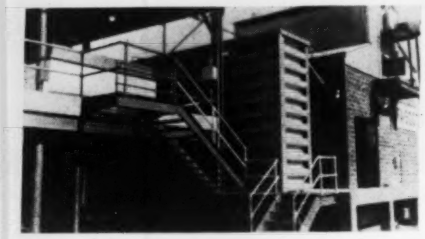
STANDARD OIL COMPANY
(INDIANA)

Equipment, Materials, and Methods

New Developments of Interest, as Reported by Manufacturers

Barricade Walls

A BOMB-SPLINTER PROTECTION measure, suggested by the Armco Drainage Products Association and the Armco International Corporation, Middletown, Ohio, is the use of bin-type metal retaining walls arranged in various layouts. These walls, set vertically and to any height required, give ample protection against bomb splinters, and have the advantage of occupying a minimum of valuable space. They are quickly installed by unskilled labor, or dismantled and stored in a small space.



Metal barricade walls are not entirely a new idea. Hundreds of them have been installed at ordnance plants in this country to isolate any possible blasts and to protect adjoining buildings. Drawings and photographs showing the construction of these barricade walls may be obtained from Armco Drainage Products Association.

Typical Timber Designs

"TYPICAL DESIGNS OF TIMBER STRUCTURES" has just been published by Timber Engineering Company, 1337 Connecticut Ave., N.W., Washington, D.C., to aid architects and engineers in the solution of timber designing problems. In no sense a "plan service," this reference work is intended to be a permanent addition to their technical libraries.

The 11 × 17 in. compilation presents 48 detailed drawings, selected by the Teco Engineering staff. The plans cover fourteen different types of timber design such as trussed rafters for housing projects, trusses for hangars, factories, and markets, grandstands, distillery racks, bridges and towers. Each group is introduced by a photograph of an actual structure in which that type of design was employed, and an explanation of its use. In the back of the book are "Handy Tables for Use in Timber Design," taken from the National Lumber Manufacturers Association publication, "Wood Structural Design Data."

Loose-leaf binding permits removal of pages for more convenient use, and easy insertion of additions which will be distributed from time to time. Each copy is numbered and contains a return postcard. By returning the postcard, the holder places his name on the mailing list to receive future supplements.

Pomona Acquires Westco

POMONA PUMP CO., manufacturers of vertical pumps, announce the purchase of the Westco Pump Division of Micro-Westco, Inc., Bettendorf, Iowa. The newly acquired business will be operated as Pomona Pump Co., Westco Division, at 2621 Locust St., St. Louis, Mo., and will continue the manufacture and distribution of the complete line of Westco pumps. Addition of the Westco turbine type pump for industrial and marine application, boiler feed and condensation units, side suction centrifugals, complete water systems, and drainers, rounds out the line of Pomona deep well and low lift pumps.

New 10 and 20-Ton Transit Cranes

FEATURING UNUSUAL FLEXIBILITY, the 15-B and 22-B Bucyrus-Erie transit cranes just announced are fully convertible from crane to clamshell, dragline, shovel and dragshovel service, and are also designed for quick conversion from the wheel mounting to standard crawler mounting.

The smaller of these transit cranes is the 15-B with a 10-ton maximum crane rating and convertible to $^1/_2$-yd excavator. The 22-B has a maximum crane rating of 20 tons and is convertible to a $^3/_4$-yd clamshell, dragline, shovel or dragshovel.

The Bucyrus-Erie wheel mounting provides an all-welded base; tandem rear axles mounted on an equalizer beam; dual worm drive; and a rugged transmission with 10 forward and 2 reverse speeds. Use of two identical engines, one for propelling, the other for handling hoist, swing, etc., simplifies maintenance and repair. Maximum speed on level ground is 27.5 mph for 15-B and 31 mph for 22-B.

The 15-B is equipped with vacuum booster-set air brakes on all four rear wheels and the 22-B carries Westinghouse internal air brakes on the rear wheels. Service brakes on both models can be locked in engaged position; an additional cable-operated mechanical parking brake is standard on both units. Bulletin TC-1; copies from Publicity Department, Bucyrus-Erie Co., S. Milwaukee, Wis.

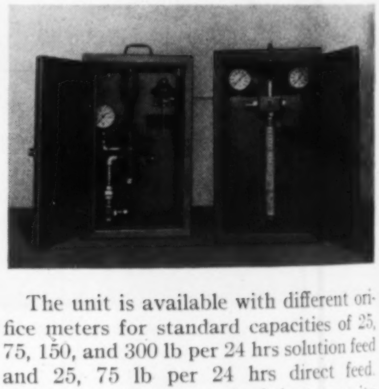
Improved Paper for Dry-Developed Prints

THE FREDERICK POST COMPANY has recently improved their ammonia dry-developed printing paper—Vapopaper. The new Vapopaper develops a deeper, sharper blue or red line print on a clean white background. An important feature of the new Vapopaper is that every roll is entirely uniform as to speed and color. Printing and developing machines do not have to be set to conform with the variance of speed in different rolls of paper.

A free 5 yd sample is offered those who are equipped to produce ammonia dry-developed prints. In writing The Frederick Post Company, Box 803, Chicago, Ill., for your sample, state whether you prefer blue or red line Vapopaper in the regular or fast printing speed.

New Portable Chlorinator for Emergency Protection

A NEW PORTABLE chlorinating unit designed to meet emergency calls quickly and efficiently has been introduced by Wallace & Tiernan Co., Inc., Belleville, N.J. In addition to its emergency protection, the new unit is useful at all times for dead-end flushing, main sterilization, and other chlorination needs away from the plant. Wherever water of sufficient pressure to operate an injector is available, the new portable unit provides for solution feed. Other conditions can be met by gas feed. In either case, the rate of application is accurately maintained by compensator control, which overcomes pressure changes in the chlorine cylinder.



The unit is available with different orifice meters for standard capacities of 25, 75, 150, and 300 lb per 24 hrs solution feed and 25, 75 lb per 24 hrs direct feed. Rates of feed within each of these capacity limits can be adjusted over a 7 to 1 range. The equipment is supplied complete in three cases for convenient portability: (1) meter device and compensator; (2) injector and check valve assembly; (3) accessories and tools for making main connections. In operation, the chlorinator cases may be set up on a table or bench, or hung on a wall. Bulletin No. 231.

Blackout Wanted
in the drafting room!
made in U.S.A. DIXON'S ELDORADO HB

Eldorado makes perfect blackouts . . . *quick*

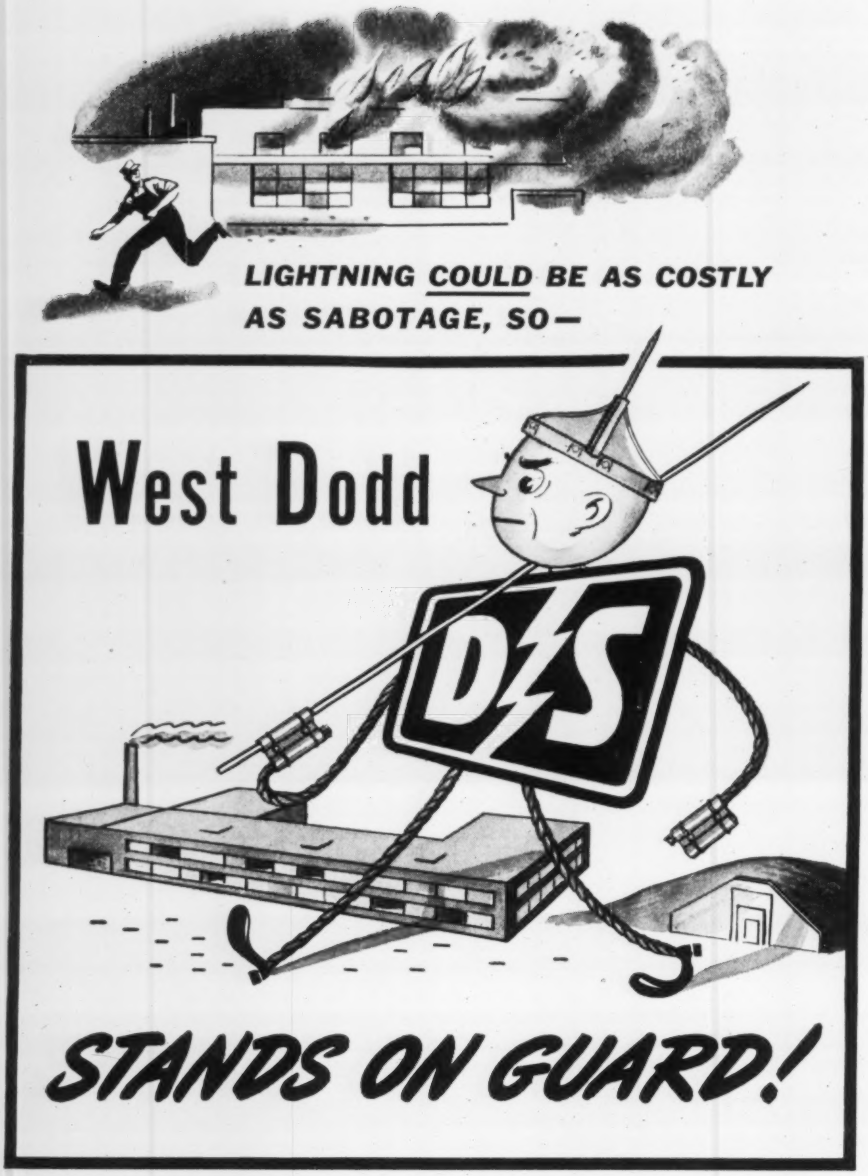
Eldorado's black line would shame a black cat for blackness! It's even, firm, opaque. That's because Eldorado is made by the exclusive *Typhonite* process which produces a lead as true and reliable as a U. S. Marine!

The smooth, perfect, opaque line you make with an Eldorado pencil is helping to win the war! Materials for Victory all start at the board. The cleanness of the line has all to do with the clearness of the blueprint. Insist upon *Typhonite* Eldorado.

Free Booklet
telling the interesting story of the Typhonite process and pencil-making. Please write on your professional or business stationery.

TYPHONITE
ELDORADO

PENCIL SALES DEPARTMENT **38-J4** · JOSEPH DIXON CRUCIBLE CO. · JERSEY CITY, N. J.


LIGHTNING COULD BE AS COSTLY AS SABOTAGE, SO—
West Dodd
D/S
STANDS ON GUARD!

★ West Dodd Lightning Protection and static control equipment is standing guard over many plants vital to the nation's war effort, providing protection against something that could be as costly as sabotage. Over ammunition loading lines, over powder igloos and on shell loading plants. Over power stacks, and often the factories, where fighting tools are being forged.

Many items of West Dodd materials have been specially designed to meet U. S. Government specifications and requirements. Inspected and labeled in the plant by Underwriters' Laboratories. Approved by American Institute of Electrical Engineers.

Prompt delivery and complete cooperation on the job have earned for West Dodd commendations like that of W. W. Clark, President of The Dingle-Clark Company, contracting engineers of Cleveland, who writes: "—I really feel that we, as a company, performed a real service to the country in the operations we carried on at ——— Arsenal. Your cooperation with us played an important part in our ability to furnish vital parts of this job on time..."

WEST DODD
LIGHTNING CONDUCTOR CORP.

A RELIABLE PROTECTION AGAINST
A LEADING CAUSE OF FIRE
D/S

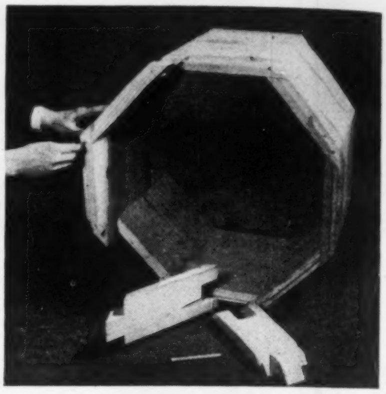
GOSHEN, INDIANA

FREE The West Dodd Engineering Dept. will be glad to assist in planning application, or estimating costs.

Wartime Drainage Pipe

HOW TO BUILD DRAINAGE structures without the use of any critical materials has been solved by the new Armco Emergency Pipe, recently invented by the Armco Drainage Products Association, Middletown, Ohio.

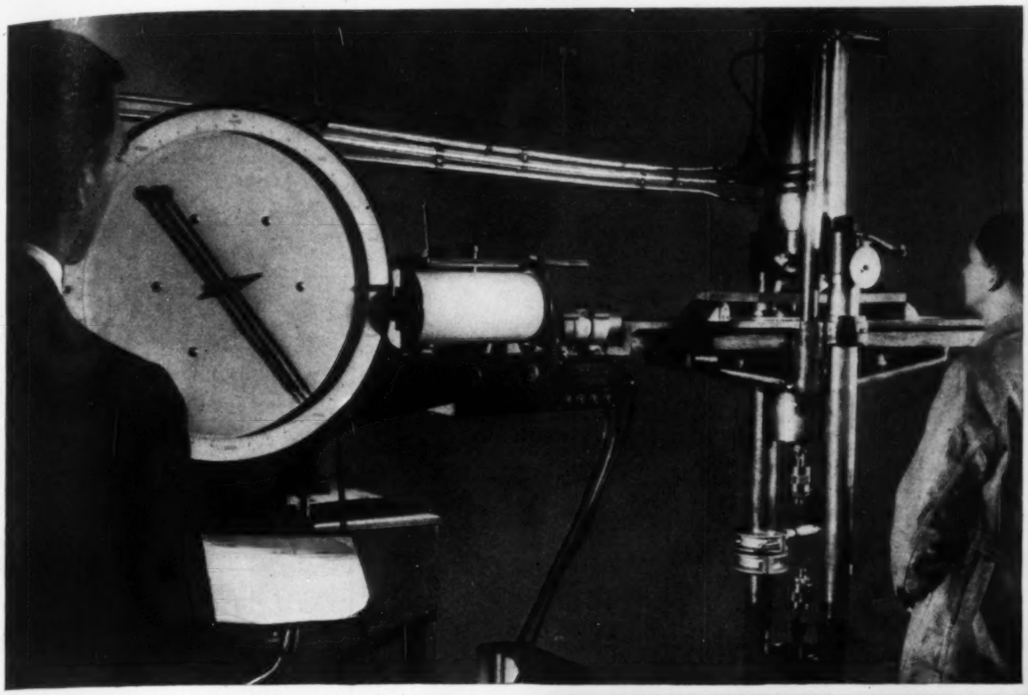
Although it is still possible to get corrugated metal pipe for important locations on defense projects where no suitable substitutes can be found, such as airport runway drains under shallow cover and other locations of limited headroom or bad foundation conditions, there is a definite need for finding suitable substitutes for all other locations. To solve this problem, the Armco organization, with 38 years of drainage and research experience set about to produce a wartime substitute.

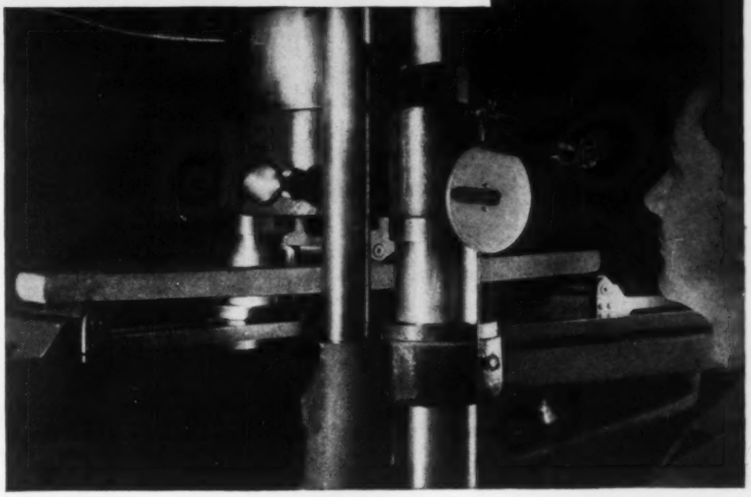


The result was a wood structure—100% of non-critical materials—requiring no steel bands, nails, or metal reinforcing of any kind. Wood has the advantage of being reasonably plentiful in most parts of the country; it can be designed for ample strength; it is sufficiently durable for the duration; and it is light in weight. Unlike the ordinary box-type of structure, the opening of the Emergency Pipe is made up of a series of short, stout segments given an octagonal or other polygonal shape, connected together in a way to utilize the full strength of the material. The thickness of the wood can be varied with the nominal diameter of the pipe. The units are shop assembled or fabricated into lengths of 12 ft or more, which in turn are simply joined together in the field to make a single structure.

Strength tests show that the Emergency Pipe possesses many of the structural characteristics of corrugated metal pipe. It has flexibility which enables it to build up side support and increases its load carrying capacity. Increased durability is obtained by treating the wood with a non-critical material. It is intended to outlast the 5 to 10-year period for which most of the present army camps and cantonments are being built. On more permanent installations, replacement can readily be made either by threading a corrugated metal through it or by jacking a metal pipe around it.

A 4-page folder describing the features of the Emergency Pipe may be obtained from the Armco Drainage Products Association or any of its member companies.





* The "2-inch by 1-inch Test Bar Test," illustrated above, is an acceptance test for cast iron pipe. The breaking load and deflection of the bar, which indicate the physical characteristics of the metal, are determined from this test. It is one of the routine tests made by this Company to insure that the quality of its pipe meets or exceeds the requirements of accepted standard specifications for cast iron pipe. *United States Pipe and Foundry Co., General Offices: Burlington, New Jersey.* Sales Offices in Principal Cities.

*** One of a series of controls in operation at each of our plants, beginning with inspection and analysis of raw materials and ending with tests of the finished product, all subject to the central control of our headquarters staff at Burlington.**

U.S.
cast iron
PIPE

Centrifugally or Pit Cast for water, gas, sewerage, drainage and industrial services.

Guard

YOUR WATER
SUPPLY SYSTEM

Beware of sabotage! Remember, in an emergency, your water system may save highly valuable materials, buildings and even lives.

Neglect is almost as destructive as sabotage. If your water supply system is not in tip top order, call in Layne and have necessary repairing and reconditioning done at once. Materials, except for strictly war work, may not be available later. Maintaining present equipment is real conservation.

If you require more water, arrange for additional wells and pumps without delay. Better call in a Layne engineer. He will cooperate with you in planning your additional water supply so as to use the minimum amount of materials essential to war work, yet give you an adequate, efficient and long lived installation. Layne wells and pumps are designed for your requirements regardless of size. They are noted for their high efficiency and trouble free service. They are serving all types of industries, municipalities both large and small, army and navy needs, training camps, flying fields and munitions plants.

Write, wire or telephone for further facts.

LAYNE & BOWLER, INC.
Memphis, Tennessee

LAYNE
PUMPS & WELL
WATER SYSTEMS

Affiliated Companies

Layne-Arkansas Company	Stuttgart, Ark.
Layne-Atlantic Company	Norfolk, Va.
Layne-Central Co.	Memphis, Tenn.
Layne-Northern Company	Mishawaka, Ind.
Layne-Louisiana Company	Lake Charles, La.
Layne-New York Co.	New York City.
Layne-Northwest Company	Milwaukee, Wis.
Layne-Ohio Company	Columbus, Ohio
Layne-Texas Company	Houston, Texas.
Layne-Western Company	Kansas City, Mo.
Layne-Western Co. of Minn.	Minneapolis, Minn.
Layne-Bowler New England Corp.	Boston, Mass.
International Water Supply, Ltd.	London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

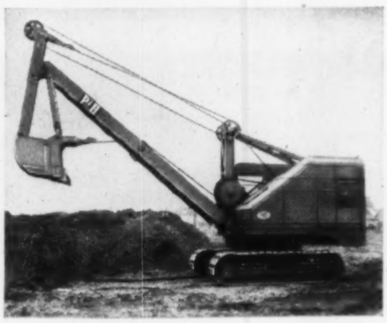
Remote Valve Control Unit

A NEWLY DESIGNED UNIT for the manual control of remote valves, dampers, and other pneumatically operated equipment, is announced by The Foxboro Co., Foxboro, Mass. In appearance, the unit harmonizes with other Foxboro recording and controlling instruments. Flush-mounted, the unit's front surface is only $^7/_{16}$ in. from the face of the instrument panel, and its setting knob and pressure indicator are recessed.

Specifically designed for dead-end service, the Remote Valve Control Unit will hold reduced pressures, dependably, to values within very narrow limits. Although most commonly used as its name suggests, it is equally useful in other applications, such as the setting of the control points of distant instruments or the adjustment of positioning or pressure-producing pistons, located in inaccessible points. It is practical for operation over distances as great as 1000 ft. Request Bulletin A-276.

New 1 $^1/_2$ Yd P&H Trench Hoe

MANY REFINEMENTS OF DESIGN are reported for the new P&H 655-A Trench Hoe introduced by Harnischfeger Corporation, Milwaukee, Wis. Fast digging is claimed to be accomplished by a new powerful gear-driven booster device with positive primary chain drive. This auxiliary drum unit also speeds dipper reversing action and increases accuracy in controlling the dipper.



The working range of the 655-A, equipped with a $1^1/_2$ yd struck measure dipper, is 22 ft digging depth, 37 ft reach, and a dumping height of 16 ft. Typical of P&H design, this new trench hoe is of all-welded alloy steel construction throughout.

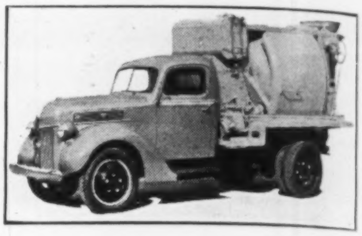
Infilco

INTERNATIONAL FILTER CO., Chicago, Ill., has changed its corporate name to "Infilco Incorporated".

Organized 48 years ago, Infilco's early activities were in the design and development of filters and filter plant equipment. Thirty years ago, the company started the manufacture of water softeners and other water conditioning equipment. To-day with its products including sewage treating equipment—as well as equipment for water conditioning—the new company name reflects this broader scope.

Rex Moto-Mixers

A COMPLETE LINE of 1942 Rex "Hi-Discharge" Moto-Mixers and Moto-Agitators in two, three, four, and five-yd sizes is announced by Chain Belt Company of Milwaukee, Wis. Primary among their features are rear charging, an improved mixing principle, and a high discharging point for greater spouting range.



The Rex drum has one opening for both charging and discharging and uses that entire opening for both purposes, with no charging door to put on or off. The wide rear charging hopper serves as a receiving hopper for aggregates while charging, a stationary throw-back blade while mixing, and affords visibility or sampling of the batch. The Rex mixing principle makes the drum self-cleaning while mixing, scouring all parts of the drum. The "Hi-Discharge" can place concrete over 20 to 22 ft areas on all types of jobs, and discharges low slump mixtures as fast as other types. Aiding this new high discharge is the Rex Quint-spout, which has five chuting lengths—and the Rex Zipper Spout Suspension.

Among other features are the completely enclosed anti-freeze water system, in which all water lines and valves are protected by the heat of the motor against freezing, and the man-size inspection hatch with quick-acting removable door.

De-Mineralizing Water

FOR SOME TIME, The Permutit Company has been working intensively on a process for De-Mineralizing water. This is the name applied to a two-step process by means of which it is possible to remove not only the cations Ca, Mg, and Na, but also the anions HCO_3, Cl, and SO_4, all of these cations and anions being commonly present in water supplies of the municipalities in this country.

The final effluent obtained approaches distilled water in quality. The precise composition of this De-Mineralized effluent to some extent depends upon the quality of the raw water, but in general the following average analysis represents its composition: Total Hardness, 0 to 2 ppm; Alkalinity to Methyl Orange, 3 to 8 ppm; Chlorides, 2 to 8 ppm; and Sulfates, 2 to 4 ppm.

To all intents and purposes this process produces distilled water at greatly reduced cost. In some cases the operating cost of this new de-mineralizing process are as low as 5% of the cost of distillation. Complete details on this new Permutit process and its application to specific conditions will be furnished by The Permutit Co., 330 West 42nd St., New York, N.Y.

UNIFORM IN SPEED

POST

NATIONWIDE NETWORK OF POST DEALERS

Atlanta—Georgia Blue Print Co.
Birmingham—James A. Head, Inc.
Boston—Boston Blue Print Co.
Buffalo—Buffalo Blue Print Co.
Chicago—Frederick Post Co.
Cincinnati—Queen City Blue Print Co.
Cleveland—The City Blue Printing Co.
Columbus—Franklin Blue Print & Supply Co.
Dallas—The Rush Co.
Dayton—Gem City Blue Print & Supply Co.
Denver—W. H. Kistler Stationery Co.

50% Rag

FOR GREATER TOUGHNESS

VAPO PAPER

FOR AMMONIA VAPOR PRINTS

POST

EVERY ROLL PRINTS AT THE SAME SPEED

● You don't have to change the speed of developing and printing equipment to conform to variance in speed *in different* rolls of paper. Not with Vapo-paper because every roll of Vapo-paper prints at the same identical speed and it's uniform in color as well. That uniformity is important today when every print must be *right.* But, that's not all. Vapo-paper will stand up under hard usage, stand up in your files too, because its rag content makes it tougher. With Vapo-paper's exclusive emulsion all the lines come up keen, sharp and trim, the solids are *solid* in Post red or true blue. Two speeds — regular and fast. For uniform speed and uniform color, for Prints with brilliance, sharpness and long life — order Vapo-paper for a free trial today.

Detroit—Frederick Post Co.
Fort Wayne—Fort Wayne Blue Print & Supply Co.
Fort Worth—Majestic Reproduction Co.
Houston—Texas Br. Frederick Post Co.
Indianapolis—Indianapolis Blue Print & Litho Co.
Jacksonville—A. R. Cogswell
Kansas City—Western Blue Print Co.
Knoxville—Sehorn & Kennedy
Los Angeles—McKinney Blue Print Co.
Memphis—Wray Williams Blue Print Co.
Milwaukee—Frederick Post Co. of Wis.
New Orleans—Southern Blue Print Co.
New York—John R. Cassell Co., Inc.
Oklahoma City—The A & E Equipment Co.
Omaha—Standard Blue Print Co.
Philadephia—Philadelphia Blue Print Co.
Pittsburgh—American Blue Printing Co.
Portland—J. K. Gill Co.
St. Louis—Service Blue Print & Photo Copy Co.
Salt Lake City—Salt Lake Blue Print & Supply Co.
Seattle—Kuker-Ranken, Inc.
Tampa—Office Equipment Company
Toledo—Toledo Blue Print & Paper Co.
Tulsa—Triangle Blue Print & Supply Co.
Washington, D. C.—R. E. MacMichael
Wichita—City Blue Print Co.

PHONE POST AND PEP-UP PRODUCTION

GET YOUR FREE TRIAL NOW

At our expense, prove to yourself the superiority of Vapo-paper. At the right is the name of your Post man. 'Phone him for your free trial supply of the new, improved Vapo-paper. Or send for your supply direct to The Frederick Post Company, Box 803, Chicago, Illinois. In making your request please include the following information. Are you equipped to produce dry developed prints? Would you prefer regular or fast, blue line or red line Vapo-paper?

POST

INSTRUMENTS • EQUIPMENT • BLUE PRINT PAPERS • KINDRED SENSITIZED PRODUCTS

JUST PHONE OR WRITE YOUR NEAREST POST MAN

SERVICISED
2-in-1 Die Cast Method
For Jointing Sewer Pipes
Faster—Better—Lower Cost

Recently improved, scientifically tested. This process has reduced $^{2}/_{3}$ of the time previously required by other methods for jointing large and medium sewer pipes. The operation is simple, continuous and handled by only one man! All of the work is preformed above the ground.

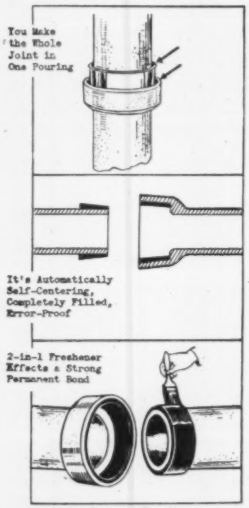
SERVICISED 2-in-1 Die Cast Method is also more economical than ordinary methods because labor is reduced at the time of making the joints and matching it in the trenches.

With the 2-in-1 Method the pipe can be prepared during any time of the year in advance of the actual laying, if desired. In this way, the pipe is always ready for immediate jointing and quick laying into the trenches.

Prepare your next sewerage job with the Servicised 2-in-1 Die Cast Method and receive complete assurance of a durable and flexible joint.

Engineers and others interested in sewerage should investigate this quick method of getting perfectly filled 100% root-repellent joints.

SERVICISED is also the manufacturer of other well known sewer pipe joint compounds such as: TUFFLEX — PRE-MOULDED SEWER PIPE BELT — HOT-POURED COMPOUND


You Make the Whole Joint in One Pouring
It's Automatically Self-Centering, Completely Filled, Error-Proof
2-in-1 Freshener Effects a Strong Permanent Bond

Patents Pending

SERVICISED PRODUCTS CORP.
6051 West 65th Street, Chicago, Ill.

A WAR MESSAGE TO ALL EMPLOYERS
is to enlist in the Pay Roll Savings Plan

The Pay-Roll Savings Plan is simple and efficient. It provides, simply, for regular purchases by your employees of United States Defense Bonds through systematic—yet voluntary—pay-roll allotments. Get the facts from the Treasury Department, Section B, 709 Twelfth St., N. W., Washington, D. C.

MAKE EVERY PAY-DAY . . . BOND DAY!
U. S. Defense BONDS ★ STAMPS

Literature Available

BRASS AND BRONZE—"Practical Data on Brass and Bronze Castings," is a new booklet published by the Hammond Brass Works, Hammond, Ind. It is designed as a handy, compact reference work of standard specifications, and applications on Copper-Tin-Lead-Zinc Alloys, Aluminum Bronzes, and Manganese Bronzes.

CENTRIFUGAL PUMPS—Catalog No. 400 covers the line of Rex Centrifugal water pumps ranging from 3,000 gph to 125,000 gph. Included in the catalog are detailed information and specifications of these pumps, and data on how to select a pump. Chain Belt Co., Milwaukee, Wis.

EARTHMOVERS—"LeTourneau Earthmoving Equipment 1942" is the title of the new, 32-page complete line catalog just released by R. G. LeTourneau, Inc., Peoria, Ill. Ask for Form No. A-276.

FORM TIES—"Howdy" might well be the title of an unusual and interesting booklet issued by Richmond Screw Anchor Co., 836 Liberty Ave., Brooklyn, N.Y. It is entitled, "An American Institution," and presents the company, the men who operate it and build its products, in a manner that creates confidence in the organization and its form-tying devices.

GAS CUTTING—Airco "45," an 8-page illustrated booklet, ADC-631, issued by Air Reduction, describes this new high speed machine cutting tip which increases the speed of flame cutting 20 to 30%. Performance facts and figures are described in text and chart form. A table of specifications enables buyers to tell at a glance the proper tip for their particular needs. Air Reduction Sales Company, 60 East 42nd St., New York, N.Y.

INDUSTRIAL RUBBER PRODUCTS—In a vest pocket size format, The B. F. Goodrich Company, Akron, Ohio, has just published the first four of a series of six pamphlets on "How to Get the Most Service out of Industrial Rubber Products." All four of the first series of pamphlets treat belting—No. 1, "Transmission Belting," No. 2, "Conveyor Belting", No. 3, "V-Belt Drives," and No. 4, "Belt Salvage."

PAVING MATERIALS MANUAL—The 64-page "Barrett Tarvia Manual" reflects the care and time spent in its compilation. It covers all of the ordinary uses of Tarvia and Tarvia-lithic. The first portion of the manual describes the operations and pavement types in which Tarvia and Tarvia-lithic are used. The methods of construction are necessarily described in general terms and local conditions may require modifications. The second portion of the manual describes the manner in which the various Tarvia methods may be utilized in the repair and maintenance of different pavement types. Tabulations of Tarvia, Tarvia-lithic, and aggregate sizes have been included. Copies from The Barrett Division, Allied Chemical & Dye Corpn., 40 Rector St., New York, N.Y.

ROLLING DOORS—Kinnear Rolling Doors, fire doors, fire shutters, rolling grilles and partitions for 1942 are described in the 40 pages of Bulletin No. 31. The Kinnear Mfg. Co., Columbus, Ohio.

A MILE OF CAST IRON PIPE
SALVAGED and SOLD
for approximately
its original cost

NEARLY forty years ago, at South Fork, Pa., about a mile of 8-inch pipe was installed to pply water to a coal mine. Last year the line was bandoned *but not the pipe.* This was *cast iron* pipe hich can be salvaged or re-used. It was dug up and lvaged for cash at a price approximately equal to s original cost—after nearly forty years of rvice. We have on file many records of old cast iron mains which have been taken up and re-used, or sold to other cities for re-use, or sold as scrap. It is impossible to foretell future requirements or population shifts in metropolitan cities but any public official can be sure that, when water or sewer mains must be abandoned or re-routed, the pipe can be salvaged or re-used, if it is cast iron pipe.

Pipe bearing this mark QC is cast iron pipe

TRADE MARK REG.

Available in diameters from 1¼ to 84 inches.

ST IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1015 PEOPLES GAS BUILDING, CHICAGO, ILLINOIS

AST IRON PIPE

Kirkland, William Galluchat (Jun. '42), Engr., Hull Div., California Shipbuilding Corp., Terminal Island (Res., 2124 Magnolia St., Long Beach), Calif.

Kramer, Edwin Weed, Jr. (Assoc. M. '42), Associate Engr., U.S. Bureau of Reclamation, California Fruit Bldg. (Res., 5041 Eighth Ave.), Sacramento, Calif.

Kryzer, Benjamin Henry (Jun. '41), Asst. Progress Engr., Foley Bros., Inc., and Walbridge Aldinger Co., Twin Cities Ordnance Plant (Res., 994 Sherburne Ave.), St. Paul, Minn.

Lakos, Eugene Alexander (Jun. '41), Junior Engr., U.S. Engrs., 751 South Figueroa (Res., 411 South Hoover St.), Los Angeles, Calif.

Landin, Arthur David (Jun. '41), Field Engr., Dry Dock Associates, Norfolk Navy Yard (Res., 808 Webster Ave.), Portsmouth, Va.

Laughlin, John Victor (Jun. '41), 2d Lt., U.S. Army, 1st Armored Regiment, Fort Knox, Ky.

Lawson, Victor Fremont (M. '42), Chf. Engr., Martin Fireproofing Corp., 775 Main St., Buffalo, N.Y.

Leon, Felix Antonio (Assoc. M. '42), Civ. Engr., Dept. of Interior, San Juan, Puerto Rico.

Lewis Donald William (Jun. '41), Care, Purdue Univ., Civ. Eng. Bldg., West Lafayette, Ind.

Livingston, Edward Ernest, Jr. (Jun. '41), 2d Lt., Ordnance Dept., U.S. Army, Aviation Ordnance, Army Post Office 807, British Guiana.

Lobenstein, Walter Henry, Jr. (Jun. '42), Draftsman, Detailer and Designer, Permanente Metals Corp., Permanente (Res., 450 Page Mill Rd., Palo Alto), Calif.

Luck, Davis Royall (Jun. '42), Junior Highway Engr., U.S. Public Roads Administration, Apartado Q, San Jose, Costa Rica.

MacFralene, Carl Cecil (Assoc. M. '42), Engr., J. C. Nichols Investment Co., 310 Ward Parkway, Kansas City, Mo.

McCoy, Byron Omar (Assoc. M. '42), Asst. Hydr. Engr., William P. Creager, Elec. Bldg., Buffalo, N.Y.

Mann, George Boley (Jun. '42), Junior Engr. (Civ.), Aberdeen Proving Ground (Res., 136 Parke), Aberdeen, Md.

Marshall, Frederick Charles (Jun. '41), Junior Bridge Engr., State Div. of Highways, 1120 N St. (Res., 717 Twenty-Fourth St.), Sacramento, Calif.

Martone, Adolph Nichols (Jun. '42), 507 Palisade Ave., Union City, N.J.

Montney, Ormand Homer (Assoc. M. '42), Structural Design Engr., Giffels & Vallet, Marquette Bldg., Detroit, Mich. (Res., 348 West 9th St., Freemont, Nebr.)

Nottingham, Howard Dailey (Assoc. M. '42), Area Engr., U.S. Army, Fort Belvoir, Va. (Res., 1424 Somerset Pl., N.W., Washington, D.C.)

Nystrom, Paul Godfrey (Jun. '41), Asst. Engr., Metcalf & Eddy, Statler Bldg. (Res., 86 Gainsborough St.), Boston, Mass.

Peirce, Earl Harvey (Jun. '41), Junior Hydr. Engr., U.S. Geological Survey, 303 Federal Bldg. (Res., 969 East South Temple), Salt Lake City, Utah.

Peletz, Cyril Morton (Jun. '41), Lt., Coast Artillery Corps., U.S. Army, A-54 Camp Callan (Res., 1660 West Acacia St., Stockton), Calif.

Pike, Lloyd Franklin (Jun. '41), Lt., U.S. Army, Fort Preble, Me.

Pitter, Cuthbert Altamont Linton (Jun. '41), With Jamaica Base Contrs., CB-4, Fort Simonds (Res., 14 Hagley Park Rd., Halfway Tree), Jamaica.

Plog, Charles Bartol (Jun. '42), Care, Am. Gas & Elec. Service Corp., 30 Church St., New York, N.Y.

Pratt, Jack Wilson (Jun. '42), Asst. San. Engr., State Dept. of Public Health, 3093 Life Sciences Bldg. (Res., 2589 Le Conte Ave.), Berkeley, Calif.

Priester, Virgil Douglas (Jun. '41), Senior Insp., Miscellaneous Supplies, New Orleans Port of Embarkation, Poland and Dauphine Sts., New Orleans, La.

Rawlings, Junius Hawes (Assoc. M. '42), Engr.-Accountant, M.P.R.R., 1101 M. P. Bldg. (Res., 5346 Itaska St.), St. Louis, Mo.

Repass, George Herbert (Jun. '41), Junior Naval Archt., U.S.N., Bureau of Ships, Washington, D.C. (Res., 2406 South 27th St., Arlington, Va.)

Ruddell, Roy Major Alexander (Jun. '41), 2d Lt., U.S. Marine Air Corps, 1000 South Main St., New Castle, Ind.

Ryan, John William, Jr. (Jun. '41), With Bethlehem Steel Co., 27 Front St., Elizabeth, N.J. (Res., 370 Richmond Hill Rd., Staten Island, N.Y.)

Sackheim, Abbot Abraham (Jun. '42), 616 Virginia Ave., Norfolk, Va.

Schendel, Alvin Christian (Jun. '41), Rodman, Soo Line R.R., 1520 Soo Line Bldg. (Res., 1332 Irving Ave., North), Minneapolis, Minn.

Seamans, Lynn Andrew (Jun. '41), Junior Engr. (Civ.), Humble Oil & Refining Co., Box 2180, Houston, Tex.

Siemsen, Martin Leonard (Jun. '41), Junior Engr., Cities Service Oil Co., 407 Dewey Ave., Bartlesville, Okla.

Smythe, Jesse Virgil (M. '42), Engr., Bridge Design, State Highway Comm., State House Annex (Res., 337 West 44th St.), Indianapolis, Ind.

Sneddon, Fred Warren (Jun. '41), Care, Maps and Surveys, TVA, Chattanooga, Tenn.

Strandhagen, Adolf Gustave (Jun. '42), Instr., Carnegie Inst. of Technology, Pittsburgh, Pa.

Underwood, Roy Traxel (Jun. '41), Ensign, A-V (S), U.S.N.R., Bureau of Aeronautics, Room 2948, Washington, D.C. (Res., 2606 South Veitch St., Apt. 3, Arlington, Va.)

Veale, John Harold (Assoc. M. '42), Area Engr., U.S. Engr. Area Office, Box O, Lordsburg, N.Mex.

Webb, James Ellsworth (Jun. '41), Junior Engr., U.S. Engr. Office, 605 Federal Bldg., Detroit (Res., 1530 Jerome St., Lansing), Mich.

Weissman, Leonard Abraham (Jun. '41), Junior Engr., U.S. Engr. Dept., Louisville (Res., 3816 Staebler Ave., St. Matthews), Ky.

Wellborn, Arvin Sparks (Assoc. M. '42), Asst. Mgr., Highway Emulsion, Inc., Box 1095, El Dorado, Ark.

Wenrick, John Courtney (M. '42), Commr., Eng. and Constr., City of Cleveland, 518 City Hall (Res., 3187 West 162d St.), Cleveland, Ohio.

Wentworth, Cecil Edmund (Jun. '41), Junior Cadastral Engr., Gen. Land Office, 201 Post Office Bldg., Glendale, Calif. (Res., Sanbornville, N.H.)

Werner, Bernard Louis (Assoc. M. '42), Asst. Constr. Engr., Bureau of Water Supply, 507 Municipal Bldg. (Res., 4717 Beaufort Ave.), Baltimore, Md.

Wheeler, Millard Franklin (Assoc. M. '42), Structural Engr. and Designer, Consolidated Gas & Elec. Co., Madison St. Bldg. (Res., 3404 White Ave.), Baltimore, Md.

Zeman, Joseph Michael (Jun. '41), 5306 South Damen Ave., Chicago, Ill.

MEMBERSHIP TRANSFERS

Bigwood, Burke Lincoln (Assoc. M. '32; M. '42), Dist. Engr., U.S. Geological Survey, 410 Asylum St., Hartford (Res., 12 Paxton Rd., West Hartford), Conn.

Edmonston, Thomas Ritchie (Jun. '37; Assoc. M. '42), Structural Engr. and Estimator, E. P. Knollman, 7649 Old Georgetown Rd., Bethesda (Res., 606 Pickwick Lane, Chevy Chase), Md.

Elliot, Donald George (Jun. '33; Assoc. M. '42), Civ. Engr., Aluminum Co. of Canada, 1700 Sun Life Bldg., Montreal, Canada.

Goddard, James Elmer (Jun. '28; Assoc. M. '37; M. '42), Capt., Corps of Engrs., U.S. Army, Engr. Reproduction Plant, Army War College, Washington, D.C.

Grady, Hamilton Gamble (Assoc. M. '35; M. '42), Structural Engr., J. M. Montgomery & Co., 306 Third St. (Res., 1572 Oak Grove Drive), Los Angeles, Calif.

TOTAL MEMBERSHIP AS OF APRIL 9, 1942

Members	5,753
Associate Members	6,867
Corporate Members	12,620
Honorary Members	35
Juniors	4,951
Affiliates	68
Fellows	1
Total	17,675

Jones, Louis Edward (Jun. '32; Assoc. M. '42), Constr. Engr., 36 East Hickory Rd., Lombard, Ill.

Kappe, Stanley Edward (Jun. '31; Assoc. M. '42), Dist. San. Engr., Chicago Pump Co., 5230 Massachusetts Ave., N.W., Washington, D.C.

Knudsen, Clarence Virgil (Jun. '37; Assoc. M. '42), Senior Engr., State Dept. of Roads and Irrig., State House (Res., 3911 Everett), Lincoln, Nebr.

Komiakoff, Leo Nicholas (Jun. '37; Assoc. M. '42), Eng. Insp., Board of Water Supply, City of New York, Carmel (Res., 137 Ave. A, New York), N.Y.

Kring, Charles Udell (Jun. '32; Assoc. M. '42), Care, Parsons, Klapp, Brinckerhoff & Douglas, 142 Maiden Lane, New York, N.Y.

Laverty, Finley Burnap (Jun. '25; Assoc. M. '30; M. '42), Chf. Hydr. Engr., Los Angeles County Flood Control Dist., 751 South Figueroa St., Los Angeles (Res., 502 Lakeview Rd., Pasadena), Calif.

Little, Walter Burgess (Jun. '39; Assoc. M. '42), Associate Engr., U.S. Engr. Dept., 700 Central Bldg., Seattle, Wash.

Miller, Garner Wakefield (Jun. '12; Assoc. M. '20; M. '42), Prin. Engr., Memphis Dist., U.S. Engr. Dept., Box 97 (Res., 1668 Autumn Ave.), Memphis, Tenn.

Nussbaumer, Newell Louis (Assoc. M. '31; M. '42), Pres., Nussbaumer & Clarke, Inc., 327 Franklin St., Buffalo, N.Y.

Seitz, Bradley George (Jun. '38; Assoc. M. '42), Associate Engr., U.S. Engr. Office, Chimes Bldg. (Res., 138 Niven St.), Syracuse, N.Y.

Simatovich, Anthony Patrick (Jun. '37; Assoc. M. '42), Associate Engr. (Structural), U.S. Engr. Office, 74 New Montgomery St. (Res., 2801 Pine St.), San Francisco, Calif.

Soule, John Edward (Jun. '24; Assoc. M. '32; M. '42), Maj. Corps of Engrs., U.S. Army, Constr. Div., Care, Chf. of Engrs., Washington, D.C.

Stanley, Wyatt Richard (Jun. '39; Assoc. M. '42), Asst. Hydr. Engr., Bureau of Agri. Economics, 502 Oliver Eakle Bldg., Amarillo, Tex.

Stocker, Frank Raymond (Jun. '31; Assoc. M. '42), Secy. Edeburn, Cooper & Co., 2103 Law and Finance Bldg., Pittsburgh (Res., Watson and Fawcett Sts., Coraopolis), Pa.

Strattman, Charles Robert (Assoc. M. '19; M. '42), Div. Engr., New York Central R. R. System, Michigan and Milwaukee Sts., Jackson, Mich.

Vaughan, Norman Ernest (Assoc. M. '37; M. '41), Mgr., Asphalt Dept., Vacuum Oil Co., Pty., Ltd., 29 Market St., Melbourne C. 1, Victoria, Australia.

Whittlesey, Harold Cruver (Assoc. M. '28; M. '42), Cons. Structural Engr., 525 North Normandie Ave., Los Angeles, Calif.

Wolf, Clemens William Henry (Jun. '31; Assoc. M. '36; M. '42), Res. Engr., Columbia Chemical Div., Pittsburgh Plate Glass Co., 233 Clark St., New Martinsville, W.Va.

Wyman, Alton Bertram (Jun. '34; Assoc. M. '42), Engr., Roads and Grounds, Post Utilities, U.S. Engrs. (Res. Goldville), Fort Knox, Ky.

REINSTATEMENTS

Engstrom, Roy Victor, M., reinstated Mar. 18, 1942.

Grupe, Edgar Young, Assoc. M., reinstated Mar. 19, 1942.

Kelly, Will Lee, Assoc. M., reinstated Mar. 9, 1942.

Pratt, Walter Mitchell, Assoc. M., reinstated Mar. 23, 1942.

Read, William Arthur, Assoc. M., reinstated Apr. 8, 1942.

Sault, Leon Herbert, M., reinstated Mar. 18, 1942.

Sullivan, Clarence Thiel, Assoc. M., reinstated Mar. 30, 1942.

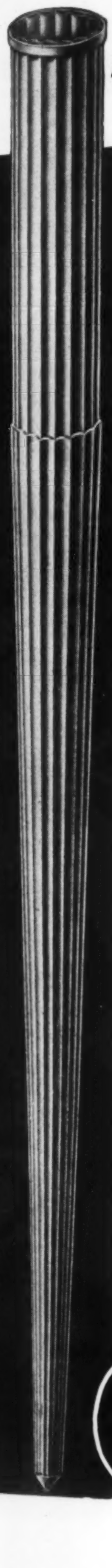
Wolfe, Joseph Marion, Assoc. M., reinstated Mar. 30, 1942.

RESIGNATIONS

Deane, William Francis, Assoc. M., resigned Apr. 1, 1942.

Stone, Harold Alfred, Assoc. M., resigned Apr. 1, 1942.

Thornton, Louis Earle, Assoc. M., resigned Mar. 31, 1942.



These **EXTENDIBLE MONOTUBES** went to sea to *speed* construction at an important U. S. naval base

Part of a recent shipment of 60 carloads of Monotube Piles and Extensions bound for a U. S. naval base—to save construction time for Uncle Sam.

Here's how MONOTUBES *save time . . .*

TODAY, time is *everything!* Every construction job is a *rush* job as Uncle Sam prepares to out-produce the Axis.

In this "battle of time" Union Metal Monotubes are playing a leading role on every front. Wherever Steel Monotubes are used for the installation of cast-in-place concrete piles, precious hours, days—even weeks—are saved in construction schedules.

Now—when time means so much—it will *pay you* to consider carefully these time-saving advantages of The Monotube Method of Pile Construction . . .

1. **SPEEDY HANDLING.** Monotube steel casings are light in weight for fast and economical handling.
2. **SPEEDY DRIVING.** Tapered Monotubes are so strong and rigid they require no heavy core or mandrel and can be driven with average job equipment (crawler crane, equipped with standard leads and hammer).
3. **SPEEDY EXTENSION.** Use of Extendible Monotubes permits installation of varying pile lengths on the job without delay or waste—permits quick installation even in low headroom.
4. **SPEEDY INSPECTION.** Hollow, tubular design enables you to inspect casing quickly and thoroughly from top to toe, prior to concreting.

Any job's a job for Monotubes—because these sturdy casings are available in a gauge, taper, and size to satisfy your load-carrying requirements in *any* soil condition.

Experienced Union Metal engineers are always at your service. Act *today!* Write us for Catalog No. 68A.

Keep 'em Flying!

THE UNION METAL MANUFACTURING CO.
CANTON, OHIO

Applications for Admission or Transfer

Condensed Records to Facilitate Comment from Members to Board of Direction

May, 1942 NUMBER 5

The Constitution provides that the Board of Direction shall elect or reject all applicants for admission or for transfer. In order to determine justly the eligibility of each candidate, the Board must depend largely upon the membership for information.

Every member is urged, therefore, to scan carefully the list of candidates published each month in CIVIL ENGINEERING *and to furnish the Board with data which may aid in determining the eligibility of any applicant.*

It is especially urged that a definite recommendation as to the proper grading be given in each case, inasmuch as the grading must be based upon the opinions of those who know the applicant personally as well as upon the nature and extent of his professional experience. Any facts derogatory to the personal character or professional reputation of an applicant should be promptly communicated to the Board.

Communications relating to applicants are considered strictly confidential.

The Board of Direction will not consider the applications herein contained from residents of North America until the expiration of 30 days, and from non-residents of North America until the expiration of 90 days from the date of ths list.

MINIMUM REQUIREMENTS FOR ADMISSION

GRADE	GENERAL REQUIREMENT	AGE	LENGTH OF ACTIVE PRACTICE	RESPONSIBLE CHARGE OF WORK
Member	Qualified to design as well as to direct important work	35 years	12 years	5 years RCM*
Associate Member	Qualified to direct work	27 years	8 years	1 year RCA*
Junior	Qualified for sub-professional work	20 years	4 years	
Affiliate	Qualified by scientific acquirements or practical experience to cooperate with engineers	35 years	12 years	5 years RCM*

* In the following list RCA (responsible charge—Associate Member standard) denotes years of responsible charge of work as principal or subordinate, and RCM (responsible charge—Member standard) denotes years of responsible charge of IMPORTANT work, i. e., work of considerable magnitude or considerable complexity.

APPLYING FOR MEMBER

ANGELL, LESTER WILLIAM (Assoc. M.), Massena, N.Y. (Age 35) (Claims RCA 0.6 RCM 6.2) Jan. 1941 to date Structural Engr., U.S. Engr. Dept., St. Lawrence River Dist.; previously Asst. Structural Engr. and Associate Structural Engr., TVA.

BAYLEY, CHARLES ABERCROMBIE DUNBAR, Montclair, N.J. (Age 64) (Claims RCM 40.9) 1939 to date Associate and Vice-Pres. and Gen. Mgr., John Monks & Sons, Inc., of New York; previously (10 years) Vice-Pres., The Foundation Co. of New York and subsidiaries.

BELL, CHARLES ARTHUR, Lafayette, La. (Age 57) (Claims RCA 7.6 RCM 21.7) June 1941 to date Dist. Engr., Louisiana Dept. of Public Works; July 1939 to June 1941 Area Drainage Engr., SCS, Dept. of Agriculture; previously Drainage Engr. for all CCC Drainage Camps in Louisiana.

BROADFOOT, HOLLIS LEE, Gilbertsville, Ky. (Age 41) (Claims RCA 6.0 RCM 7.3) July 1933 to date with TVA, as Engr., Field Engr., Asst. Constr. Engr., etc., and (since Jan. 1942) Constr. Engr., Kentucky Dam.

BURRIS, THOMAS FREDERICK, Grand Rapids, Mich. (Age 42) (Claims RCM 12.5) Oct. 1928 to date with Pere Marquette Ry. Co., as Instrumentman and (since Oct. 1929) Asst. Div. Engr.

BUSHEE, RALPH JOHN, Decatur, Ill. (Age 45) (Claims RCA 9.8 RCM 9.4) Sept. 1938 to date Designing Engr., Chas. W. Cole & Son, South Bend, Ind.; previously Designing Engr., Hughes Tool Co., Houston, Tex.; Sales Engr., The Jeffrey Mfg. Co., Columbus, Ohio.

CALLAHAN, SAMUEL JOSEPH (Assoc. M.), Kansas City, Mo. (Age 49) (Claims RCA 9.5 RCM 6.3) Dec. 1940 to date with Smith, Hinchman & Grylls, Inc., Detroit, Mich., as Res. Civ. and Structural Engr., and (since Oct. 1941) Res. Chf. Engr.; previously with Dept. of Public Works, Kansas City, Mo., as Engr. Inspector, and Superv. Engr.

CAROLLO, JOHN ANDREW (Assoc. M.), Phoenix, Ariz. (Age 36) (Claims RCA 3.0 RCM 7.2) Jan. 1933 to date Cons. Engr., Headman, Ferguson & Carollo, Engrs.

CUTTING, RICHARD HAWLEY, Cleveland Heights, Ohio. (Age 40) (Claims RCA 3.0 RCM 10.0) 1934 to date Archt. with Garfield, Harris, Robinson & Schafer, Archts., Cleveland, Ohio.

DICKSON, HUGH CLINT (Assoc. M.), El Paso, Tex. (Age 42) (Claims RCA 3.8 RCM 5.0) July 1938 to Nov. 1939 Engr., and March 1940 to date Chf. Engr., Constr. Q.M., Fort Bliss, Tex.; in the interim Cons. Engr. at El Paso; previously Res. Engr.-Inspector, Water Dept., El Paso.; Engr.-Mgr., Western Gold Mining Co., El Paso.

GAUGER, RAYMOND JULIUS, North Augusta, S.C. (Age 39) (Claims RCA 0.1 RCM 10.7) Dec. 1938 to date Chf. Engr., Merry & Parsons, Archts., Augusta, Ga.; previously Dist. Reconditioning Supervisor, HOLC, Wisconsin Agency.

GOLDFINGER, HENRY, New York City. (Age 47) (Claims RCA 8.5 RCM 10.8) Nov. 1941 to date Chf. Engr., Foley Bros., Inc., and Spencer, White & Prentis, Inc., New York City; previously Chf. Engr. with Spencer, White & Prentis, Inc., New York City; Supt. and Superv. Engr., Hart & Early Co., Inc., Gen. Contrs., New York City.

HARLEY, FRANK ELLSWORTH, Fair Lawn, N.J. (Age 49) (Claims RCM 17.0) April 1931 to date Municipal Engr., Borough of Fair Lawn, N.J.

HAYES, NATHANIEL PERKINSON (Assoc. M.), Greensboro, N.C. (Age 40) (Claims RCA 3.5 RCM 14.9) June 1926 to date with Carolina Steel & Iron Co., as Engr., Sales Mgr., and (since April 1941) Sales Mgr., Asst. to Vice-Pres., and Director of Company.

KIRBY, PAUL BURNARD, Detroit, Mich. (Age 51) (Claims RCA 12.0 RCM 11.0) 1934 to date Engr. for Albert Kahn, Associated Archts. & Engrs., Inc.

LEE, ROBERT EDWARD, East Hartford, Conn. (Age 43) (Claims RCA 9.1 RCM 7.4) July 1928 to May 1934 Asst. Engr., and Nov. 1937 to date Area Engr., U.S. Engr. Office; in the interim with Hamer Bros., Inc., Greenville, Ohio.

LEIGHTON, FRANK CARLTON, Cincinnati, Ohio. (Age 49) (Claims RCA 6.9 RCM 17.0) Oct. 1920 to date with City of Cincinnati, Ohio, as Supt. of Constr., Rapid Transit Comm., Deputy Bldg. Inspector, Chf. Inspector of Bldgs., Asst. Structural Engr., and (since March 1941) Senior Asst. Engr. on special inspections, Dept. of Bldgs.

LESSIG, LESTER L. (Assoc. M.), Philadelphia, Pa. (Age 48) (Claims RCA 4.4 RCM 19.6) Feb. 1931 to date Contr. Engr., Bethlehem Steel Co.

PATON, WILLIAM GRAHAM, Cleveland Heights, Ohio. (Age 48) (Claims RCA 9.5 RCM 12.9) Sept. 1919 to date with The Austin Co., as Asst. Chf. Draftsman, Structural Div., Designing Engr., Div. Engr., Contracting Engr., Dist. Chf. Estimator, Asst. to Dist. Mgr., Asst. to Gen. Mgr., and (since Jan. 1942) Gen. Project Mgr.

PORTER, OMER JAMES, Sacramento, Calif. (Age 40) (Claims RCA 4.8 RCM 7.6) June 1924 to date with Div. of Highways, State of California, as Laboratory Asst., Jun. Testing Engr., Asst. Physical Testing Engr., Associate Physical Testing Engr., and (since July 1938) Senior Physical Testing Engr.

QUINN, JOSEPH LEO, JR., Indianapolis, Ind. (Age 37) (Claims RCA 5.7 RCM 8.1) April 1939 to date Senior San. Engr., Bureau of San. Eng., Indiana State Board of Health; previously Cons. City Engr., Indianapolis, Ind.; with Indiana State Highway Comm.

ROUSE, HUNTER (Assoc. M.), Iowa City, Iowa. (Age 36) (Claims RCA 4.2 RCM 4.1) Sept. 1939 to date Prof. of Fluid Mechanics, State Univ. of Iowa; also, Cons. Engr., Iowa Institute of Hydraulic Research; previously Asst. Soil Conservationist and Associate Hydr. Engr., U.S. Dept. of Agriculture, Pasadena, Calif.

ROWE, WILLIAM PENN (Assoc. M.), San Bernardino, Calif. (Age 47) (Claims RCA 5.0 RCM 17.0) 1919 to date in private practice as Cons. Engr.

SAUNDERS, GEORGE WASHINGTON, Huron, Ohio. (Age 43) (Claims RCA 8.4 RCM 8.5) Aug. 1928 to date Engr. and Estimator, E. B. Badger & Sons Co., Boston, Mass., at present Office Engr. at Plum Brook Ordnance Works, Sandusky, Ohio.

SEIFRIED, JOHN FRANCIS (Assoc. M.), River Forest, Ill. (Age 50) (Claims RCA 5.0 RCM 23.0) March 1920 to date Structural Engr. to Asst. Dist. Mgr., Ceco Steel Products Corporation (Concrete Eng. Co.), Chicago, Ill.

STRASMER, CHARLES FREDERICK, JR., Buffalo, N.Y. (Age 53) (Claims RCA 10.0 RCM 12.3) Jan. 1935 to date Pres., Buffalo Gravel Corporation.

UTEGAARD, THOMAS, Wiscousin Rapids, Wis. (Age 48) (Claims RCM 15.9) Sept. 1920 to date with Consolidated Water Power & Paper Co., as Instrumentman, Draftsman, Structural Designer and Chf. of Party, and (since April 1926) Asst. Chf. Engr.

VOGELGESANG, CARL EDGAR (Assoc. M.), Indianapolis, Ind. (Age 44) (Claims RCA 3.6 RCM 17.8) May 1921 to date with Indiana Highway Comm., as Inspector, Asst. Engr., Squad Engr., Engr. of Road Design, Engr. of Plans, and (since April 1938) Engr. of Road Design.

WILKINSON, JACKSON HEATH (Assoc. M.), Knoxville, Tenn. (Age 49) (Claims RCA 9.0 RCM 14.7) Jan. 1934 to date with TVA, as Hydr. Designer and Associate Hydr. Engr., and (since July 1937) Hydr. Engr. and Senior Hydr. Engr.

WILSON, MARK KING, Chattanooga, Tenn. (Age 56) (Claims RCA 20.0 RCM 10.0) 1912 to date in private practice, Mark K. Wilson Co., Bldrs.

APPLYING FOR ASSOCIATE MEMBER

ALSUP, WILLIAM HASKELL (Junior), Jackson, Miss. (Age 32) (Claims RCA 6.6) Dec. 1941 to date Field Engr., William E. Mallett, Cons. Engr.; previously Party Chf., Ford, Bacon & Davis; Constr. Supt., and Field Supt., with WPA; member of firm, Bill Alsup Eng. Co., Corpus Christi, Tex.

ANDERSON, MAYNARD MARION (Junior), Hawthorne, Nev. (Age 31) (Claims RCA 2.7 RCM 1.7) June 1940 to date with U.S. Navy as Lt. (jg) CEC-V(S), and (since Feb. 1942) Lt., CEC-V(S); previously Senior Eng. Aide, and Prin. Eng. Aide, U.S. Engr. Office, Los Angeles, Calif.; member of firm, B. W. Anderson & Sons, Bldg. Contrs., San Diego, Calif.

BENJES, HENRY HERMAN (Junior), Fort Smith, Ark. (Age 28) (Claims RCA 1.5) Nov. 1938 to date with Black and Veatch, Archt.-Engr., as Designer-Draftsman, Engr. Inspector, Prin. Asst. Engr., and (since May 1941) Asst. Engr.

BLOUIN, PAUL EMIL, Meriden, Conn. (Age 34) (Claims RCA 4.0 RCM 5.0) 1930 to date with The Lane Constr. Corporation as Asst. Supt., Supt., and (at present) Asst. Dist. Engr.

BLUME, JOHN AUGUST (Junior), San Francisco, Calif. (Age 33) (Claims RCA 4.1 RCM 2.7)

WE ERECT A MODERN WINDMILL ATOP GRANDPA'S KNOB

The power equipment of the wind-turbine plant is carried, in approximate balance, on a slightly inclined pintle-girder, its pintle shaft at one end engaging the tower-top by means of a combined roller guide and thrust bearing which permits the entire unit to veer with the wind. The wind blades are 11 ft. wide by 65 ft. long, each weighing about 7½ tons. As assembled, their extreme diametrical dimension, tip to tip, is approximately 175 feet. The shot-welded skin-surface is of U·S·S 18-8 Stainless Steel produced by Carnegie-Illinois Steel Corp. Based on a shaft rotation of 28.7 revolutions per minute, the tip speed of the blades approximates 180 miles per hour. The Smith-Putnam wind turbine was built for the S. Morgan Smith Co.

THE fabled and romantic windmill of Cervante's day bears little resemblance to this ingeniously devised structure—the world's largest aero-electric power generating unit and the first to supply alternating current for commercial use.

Located in Vermont on a height known as Grandpa's Knob, this windmill establishes a power plant of some 1000 KW rated capacity. Its stepped up voltage will eventually feed into the transmission lines of a New England public utility.

From an engineering standpoint, major interest lies in the unusual problems involved—the centrifugal and dynamic forces produced by air currents up to 140 miles per hour—the cantilevered support and control of variable-pitch, rotating blades which, at times, are heavily unbalanced by unequal ice formations.

Its supporting tower, 36 feet square at base, rises 110 feet above foundations. The four silicon-alloy steel legs are anchored into the mountain top with steel grillages embedded in concrete footings 23 feet deep.

American Bridge not only designed, fabricated and galvanized the complete tower, but designed and fabricated, as well, the copper-nickel alloy steel spars, main supporting members of the wind blades.

Erection of the whole assemblage — including installation of all mechanical equipment, wind blades, pintle-girder, service elevator to the various working floors, and other auxiliary parts supplied by other contractors was performed by the field forces of American Bridge Company.

AMERICAN BRIDGE COMPANY

General Offices: **Frick Building, Pittsburgh, Pa.**

USS

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit · Duluth
Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

Dec. 1940 to date with H. J. Brunnier, Cons. Engr., as Designer and Leadman; previously with Standard Oil Co. of California, alternately as Structural Engr. and Field Engr.

Boothe, Perry Mattison (Junior), San Pedro, Calif. (Age 32) (Claims RCA 4.7 RCM 2.2) Feb. 1941 to date Lt., CEC, U.S.N.R., being Supervisor of Plant Expansion at Bethlehem Steel Co., Shipbuilding Div., Terminal Island, Calif.; previously Asst. Engr., and Supt. of Equipment, San Diego (Calif.) Elec. Ry.

Brooks, Robert Morris (Junior), Muskogee, Okla. (Age 32) (Claims RCA 1.7 RCM 3.0) Jan. 1936 to date with U.S. Dept. of Interior, Indian Service, as Asst. Highway Engr., and (since May 1939) Associate Highway Engr.

Bryan, Juan Alexander, Houston, Tex. (Age 35) (Claims RCA 8.9) Dec. 1941 to date Asst. Chf. Draftsman with Prack & Prack, Archts., and The Chester Engrs., Texarkana, Tex.; previously Chf. Draftsman with Freese & Nichols, Engrs., Fort Worth, Tex.; Eng. Computer, Checker and Draftsman with Union Producing Co., Shreveport, La.; Chf. Draftsman and Aide to Chf. Engr., The Pure Oil Co., Houston.

Burgess, John Jarvis, Fort Worth, Tex. (Age 28) (Claims RCA 2.5 RCM 3.4) June 1941 to date partner in firm, Carter & Burgess, Landscape Archts.-Site Engrs.; previously Civ. Engr., associated with Morrison & Carter, Landscape Archts., Site Development Eng.; with National Supply Constr. Co.

Campbell, Morgan Skiles (Junior), Galveston, Tex. (Age 32) (Claims RCA 3.2 RCM 1.1) Aug. 1934 to date with U.S. Engr. Office, as Jun. Civ. Engr., Asst. Structural Engr., and (since Sept. 1940) Asst. and Associate Structural Engr.

Carter, Marshall Sylvester (Junior), Fort Amador, Canal Zone. (Age 32) (Claims RCA 3.6) July 1927 to date with War Dept., U.S. Army, in various capacities, since Dec. 1941 Asst. Chf. of Staff G-3, War Plans and Training.

Clough, Albert Haskell, San Francisco, Calif. (Age 66) (Claims RCA 30.0) July 1915 to date Explosive Engr., Atlas Powder Co.

Collisson, Norman Harvey, New York City. (Age 42) (Claims RCA 18.5) 1938 to date Power Engr., American Gas and Elec. Service Corporation; previously Power Engr., Atlantic City (N.J.) Elec. Co.

Culp, Frank Edward, Olympia, Wash. (Age 33) (Claims RCA 5.0) Feb. 1936 to date with Washington State Highway Dept., as Chainman, Rodman, Computer, Topographer, Instrumentman, Bridge Materials Inspector, Field Draftsman, Bridge Draftsman, and (since Aug. 1937) Bridge Draftsman and Designer.

Curtis, Donald, Tulsa, Okla. (Age 33) (Claims RCA 3.4) Sept. 1935 to date with U.S. Engr. Office, as Asst. Inspector, Inspector, Eng. Aide and Senior Eng. Aide, Jun. Engr., and (since July 1941) Asst. Engr.

Daigle, Raymond Joseph, Marshall, Tex. (Age 31) (Claims RCA 2.6 RCM 0.9) Feb. 1942 to date Eng. Designer, Ford, Bacon & Davis, Inc., Archt.-Engr.-Mgr., Longhorne Ordnance Works, Karnack, Tex.; March 1941 to Feb. 1942 Designing Engr., with Benham Eng. Co., Oklahoma City, Okla., and with George P. Rice at Biloxi, Miss.; previously with Louisiana Dept. of Highways, Baton Rouge.

Davis, Allan Ripley, Jr., Garland, Tex. (Age 31) (Claims RCA 2.9) 1938 to date with U.S. Engrs., Denison (Tex.) Dam, as Asst. Eng. Aide, Jun. Engr., and (since 1940) Asst. Engr.; previously with International Boundary Comm.

Davis, Donald Carter, Modesto, Calif. (Age 40) (Claims RCA 10.8 RCM 5.7) Feb. 1941 to date Planning Engr., Cities of Modesto and Turlock, and Stanislaus County, Calif.; previously in private practice, general civil engineering.

Ellingwood, Lewis Ray, Pittsburgh, Pa. (Age 38) (Claims RCA 2.0 RCM 3.0) Aug. 1927 to date with American Bridge Co., as Draftsman and (since March 1937) with Tower Dept., as Engr.

Farwell, Joseph Willard, Mattapoisett, Mass. (Age 52) (Claims RCA 9.9 RCM 5.9) 1937 to date Engr., American Mutual Liability Insurance Co., Boston, Mass.; previously Res. Engr., Fay, Spofford & Thorndike.

Foy, Harold Clarkson, Brownwood, Tex. (Age 34) (Claims RCA 5.1) May 1941 to date at Camp Bowie, Brownwood, Tex., with Constr. Q.M., as Office Engr., and (since Aug. 1941) with U.S. Army Engrs. as Engr. (P-4); previously with Koch & Fowler, Contr. Engrs., being Asst. Office Engr.; Instrumentman, Chf. Inspector, Office Engr., Texas Highway Dept.

Garey, Irwin Buchanan, Rodgers Forge, Md. (Age 36) (Claims RCA 1.2) March 1942 to date Associate Engr., Whitman, Requardt & Smith, Engrs.; Feb. 1941 to Feb. 1942 Structural Designer, Consolidated Gas, Elec. Light and Power Co., Baltimore, Md.; previously with Pennsylvania Water & Power Co.

Gregg, Duncan Smith (Junior), Long Beach, Calif. (Age 32) (Claims RCA 2.4 RCM 2.0) March 1937 to date with Columbia Constr. Co., Long Beach, Calif., as Quarry Engr., Quarry Supt., Project Mgr., and (since Nov. 1941) Gen. Supt.

Harlow, Eugene Harrison, Glen Rock, N.J. (Age 28) (Claims RCA 1.5) June 1936 to April 1937 Asst. Design Engr., and Sept. 1939 to date Structural and Foundation Engr., Frederic R. Harris, Cons. Engr., New York City; in the interim Soils Engr., Portland Cement Association.

Harris, Theophilus Law, San Fernando, Trinidad, B.W.I. (Age 28) (Claims RCA 6.3 RCM 3.3) June 1938 to date Engr. with Harris & Pilie, Eng. Contrs.; previously Engr., Van Cliffen Contr. Co., Curaso.

Harroun, Dale Theran (Junior), Newport News, Va. (Age 32) (Claims RCA 3.9 RCM 0.9) Jan. 1942 to date Associate Structural Engr., Public Works Design Office, Norfolk (Va.) Navy Operating Base; July 1940 to Jan. 1942 Asst. Structural Engr., Office of Supervisor of Shipbuilding, U.S. Navy, Newport News (Va.) Shipbuilding and Drydock Co.; previously graduate student, Univ. of Michigan.

Hedgpeth, Lewis Sterling, San Juan, Puerto Rico. (Age 35) (Claims RCA 5.9 RCM 1.5) Jan. 1941 to date with War Dept., U.S. Engr. Office, as Asst. Engr. (Civil), and (since March 1941) Associate Engr. (Civil); previously Jun. Highway Engr., Public Roads Administration.

Henry, Hugh Benjamin, Paris, Tenn. (Age 32) (Claims RCA 5.1 RCM 0.3) Feb. 1935 to date with TVA as Eng. Aide, Jun. Highway Engr., Asst. Highway Engr., and (since Dec. 1941) Associate Highway Engr.

Hildebrandt, Christian Frank, Upper Darby, Pa. (Age 31) (Claims RCA 2.9 RCM 2.5) Jan. 1936 to Aug. 1937 Eng. and Architectural Draftsman, and Dec. 1940 to date with Dist. Engr.'s Office, FSA, as Chf. Archt.; U.S. Dept. of Agriculture; in the interim with Chemical Lime Co., Bellefonte, Pa., and Pennsylvania State College.

Holmstrom, Helmer August (Junior), Brooks Field, Tex. (Age 32) (Claims RCA 4.0) March 1941 to date Capt., Air Corps, U.S. Army, being Post Adjutant; previously with Minnesota Dept. of Highways, St. Paul, Minn., as Field Draftsman, Materials Inspector, Eng. Field Draftsman, and Instrumentman (Civ. Engr. I).

Houston, Robert Lochard (Junior), Tucson, Ariz. (Age 33) (Claims RCA 3.9 RCM 7.1) Nov. 1937 to date with Eng. Dept., City of Tucson, as Field Engr., Designer, and (since May 1940) Asst. City Engr.; previously with National Park Service, as Engr. Foreman, and Project Supt.

Hutchinson, George Willis, Raleigh, N.C. (Age 49) (Claims RCA 15.7) 1937 to date Tech. Representative for Gray Concrete Pipe Co., Thomasville, N.C., and for Viber Co., Burbank, Calif., also owner, Southern Vibrator Co., Raleigh, N.C.

Johnson, Barclay Giddings (Junior), Plainfield, N.J. (Age 32) (Claims RCA 3.0) Jan. 1941 to date Asst. Chf. Office Administrator, Caribbean Archt.-Engr., New York City; previously with New York World's Fair, as Tech. Asst. to Gen. Mgr., Operations Office Engr., Supervisor of Operating Control, and Asst. to Executive Vice-Pres.

Kinney, Joseph Sterling (Junior), Troy, N.Y. (Age 32) (Claims RCA 2.9) Sept. 1931 to June 1937 Instructor in, and Sept. 1940 to date Asst. Prof. of, Civ. Eng., Rensselaer Pol. Inst.; in the interim Draftsman, Designer, and Estimator, American Bridge Co., Elmira, N.Y.

Larson, Carl Olof (Junior), Stockton, Calif. (Age 33) (Claims RCA 7.6) Oct. to Dec. 1940 Inspector of general construction, Bonneville Dam, and Jan. 1942 to date Chf. Project Engr., Stockton Quartermaster Motor Base, U.S. Engr. Dept.; in the interim with Constructing Quartermaster, U.S. Army, as Chf. Engr., and Associate Engr.; previously with FEA of PW.

Lipson, Ralph, New York City. (Age 41) (Claims RCA 4.0) March 1932 to date Topographical Draftsman, Topographical Bureau, Pres., Boro of Queens, Kew Gardens, N.Y.

McDowell, Robert Charles (Junior), Ravenna, Ohio. (Age 29) (Claims RCA 2.7 RCM 3.2) Jan. 1941 to date Supt. Hunkin-Conkey Constr. Co., Cleveland, Ohio, previously Res. Engr. and Supt., R. C. Mahon Co., and Supt., S. E. Pentecost Constr. Co., both of Detroit.

Malloy, Ambrose John (Junior), Houston, Tex. (Age 29) (Claims RCA 3.5) Oct. 1940 to date 1st Lt., U.S. Army, at present Asst. to Area Engr., San Jacinto Ordnance Depot; previously Engr., James Stewart & Co.; with Board of Transportation, City of New York as Inspector of Steel, and Eng. Asst.

Mason, Arthur Bradley, San Benito, Tex (Age 36) (Claims RCA 11.0 RCM 2.0) June 1934 to date with International Boundary Comm., as Prin. Eng. Aide, Field Office Engr., Chf. of Party, Asst. Engr., and Associate Engr.

Milligan, Cleve Henry (Junior), Ogden, Utah (Age 32) (Claims RCA 7.4) June 1939 to date Associate Hydr. Engr., Intermountain Forest and Range Experiment Station; previously with U.S. Forest Service as Jun. Engr., Truck Coordinator, and Asst. Civ. Engr., etc.

Mosher, Arthur Augustin (Junior), Pueblo, Colo. (Age 32) (Claims RCA 2.2 RCM 7.5) June 1937 to date Sales Engr., Armco, The R. Hardesty Mfg. Co. (associated with American Rolling Mills); previously Road Engr., Dept. of Interior, Bureau of Indian Affairs, Cheyenne Agency, S.Dak.

Muchmore, Clarence Harold, Albuquerque, N.Mex. (Age 41) (Claims RCA 10.0) Feb. 1924 to date with New Mexico Highway Dept., as Chainman, Rodman, Inspector Instrumentman, Field Materials Engr., Project Engr., and (since March 1939) Chf. of party on highway location.

Murray, James Vincent, Lansing, Mich. (Age 35) (Claims RCA 3.5) May 1935 to date with Bridge Design Office, Michigan Highway Dept., as Jun. Draftsman, Senior Draftsman, Bridge Designing Engr., and (since Aug. 1941) Squad Leader.

Nagin, Harold, Pittsburgh, Pa. (Age 28) (Claims RCA 5.4) 1936 to date Chf. Engr. with Reliance Steel Products Co., McKeesport, Pa.

Reid, Graeme, Essex Fells, N.J. (Age 37) (Claims RCA 6.8 RCM 5.5) Sept. 1941 to date in private practice as Cons. Transportation Engr.; previously Engr.-in-Chg., Street Transportation Div., New Jersey State Board of Public Utility Commrs.

Rich, Lowell Redd (Junior), Cedar City, Utah (Age 32) (Claims RCA 5.4) May 1934 to date with SCS, U.S. Dept. of Agriculture as Asst. Agri. Engr., Line Project Leader, Associate Hydr. Engr., and (since May 1941) Associate Irrigation Engr.

Robley, Grant (Junior), New Haven, Conn (Age 32) (Claims RCA 1.9) 1938 to date at Yale Univ. as graduate student and Instructor; previously Instructor, Civ. Eng. Dept., Oregon State Coll.

Runyan, Damon Ogden (Junior), Salt Lake City, Utah. (Age 29) (Claims RCA 2.2) June 1941 to date Eng. Designer, Smith, Hinchman & Grylls, Inc., Detroit, Mich.; previously structural engr., J. F. Pritchard Co., Eng. Contrs., Kansas City; with Harrington & Cortelyou Cons. Engrs., Kansas City.

Schweser, Gilbert Constant (Junior), Fremont, Nebr. (Age 30) (Claims RCA 4.7) Feb. 1942 to date Asst. Engr., Giffels & Vallet, Engrs. & Archts., Fremont, Nebr.; Feb. 1939 to Feb. 1942 Constr. Engr., Wm. P. Neil Co., Ltd., Los Angeles, Calif.; previously Structural Designer, Platte Valley Public Power & Irrigation Dist., North Platte, Nebr.

Solander, Arvo Axel (Junior), Nashville Tenn. (Age 32) (Claims RCA 2.4 RCM 1.3) April 1939 to date Engr., U.S. Public Health Service; previously Engr., successively with Samuel M. Ellsworth, Maine Dept. of Agriculture, and PWA.

Steinbach, Charles William (Junior), Lewistown, Pa. (Age 32) (Claims RCA 6.5 RCM 0.8) Sept. 1935 to Jan. 1936 and July 1937 to date with Pennsylvania Glass Sand Corporation, as Engr., and (since May 1941) Chf. Engr.; in the interim Constr. Supt. for W. D. Steinbach's Sons, Gen. Contrs.

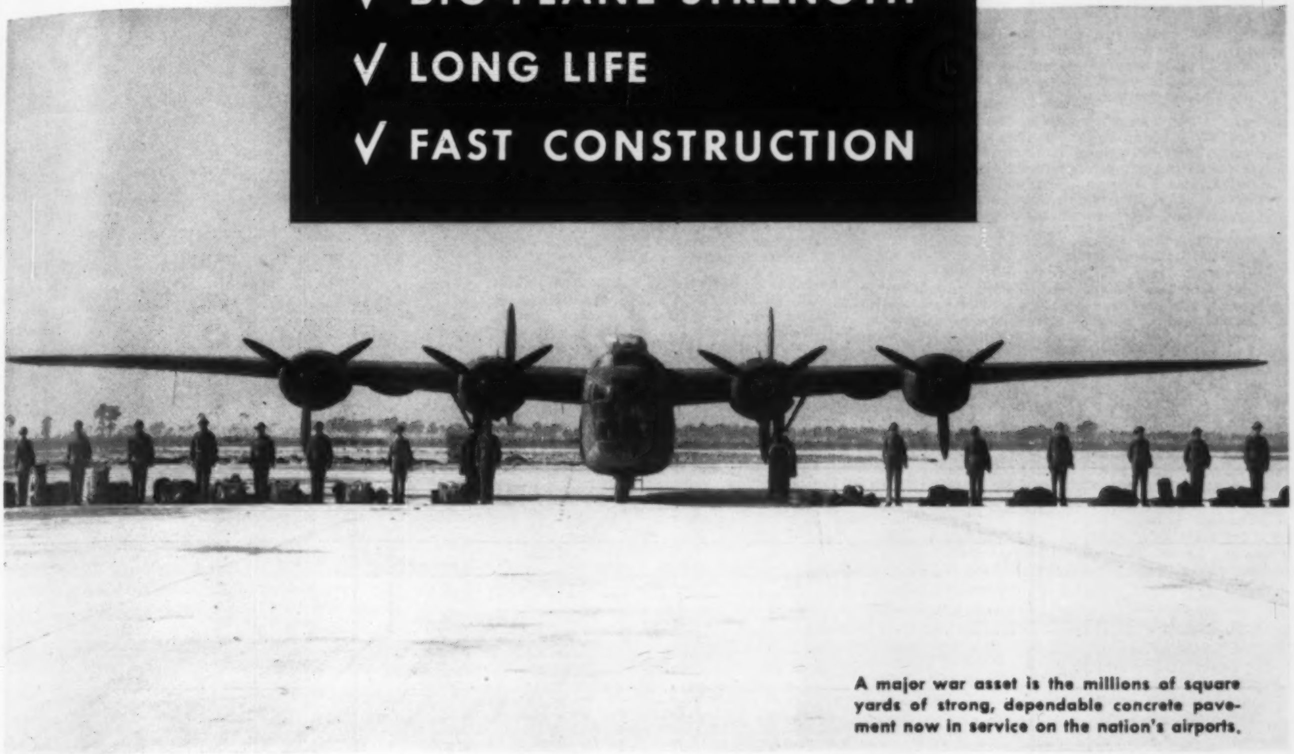
Tomb, Charles Emerson (Junior), Coopersburg, Pa. (Age 32) (Claims RCA 6.1 RCM 1.1) April to Oct. 1935 and March 1939 to date with WPA as Interviewer, Senior Field Engr., and (since April 1941) Asst. Area Supt., FWA. in the interim County Works Supervisor, National Youth Work Project, and Sales Engr., Bethlehem Steel Co.

Turner, Nathaniel Parker, Jr., Houston, Tex. (Age 38) (Claims RCA 3.2 RCM 6.3) July 1941 to date Constr. Engr., Lockwood & Andrews and David M. Duller, Archt.-Engr., San Jacinto Ordnance Depot, Houston, Tex., also, April 1936 to date partner, Research and Designing Engr. in Hays Process Co., Waco, Tex.; previously with Freese and Nichols, Archt.-Engr.

Van Vranken, Harold Douglas, Miami, Fla (Age 44) (Claims RCA 13.5) Jan. 1941 to date Staff Valuator, FHA, Coral Gables, Fla.; previously Engr. in charge of construction, representing G. S. Brockway, Cons. Engr., Palm Beach, Fla., bulkhead project on Lake Worth; previously in private practice.

Vockroth, John Henry (Junior), Scranton, Pa. (Age 32) (Claims RCA 6.0 RCM 3.3)

√ BIG-PLANE STRENGTH
√ LONG LIFE
√ FAST CONSTRUCTION



A major war asset is the millions of square yards of strong, dependable concrete pavement now in service on the nation's airports.

U. S. Army Air Corps photo

CONCRETE meets these runway "musts"

—at lowest cost

Concrete is playing a vital part in major airport construction today because it has no equal for safe, economical, uninterrupted service. As proof, look at Floyd Bennett, first concrete built in 1929... Grand Central, 1928... Lunken Field, 1932...Wayne County, 1929...Indianapolis, 1930...Barksdale Field, 1934.

These and other early concrete surfaces have carried heavier and heavier traffic with negligible maintenance and repairs.

CONCRETE AIDS ACCURATE DESIGN

Proved formulas assure safe, accurate concrete pavement designs for wheel loads up to 120,000 pounds and more.

SPEED ON THE JOB

500,000 square yards of concrete airport pavement can be completed in 30 paving days. There's minimum weather delay.

LESS MATERIAL TRANSPORTATION

Concrete provides strength for heavy duty with smallest quantities of materials, hence with minimum burden on transportation.

LOWEST FIRST COST AND MAINTENANCE

Heavy duty concrete runways cost less to build than other surfaces of equal load capacity. Their low upkeep conserves wartime labor and materials, reduces the final cost.

The assistance of our technical staff is available to designers and builders of airports and other war construction.

PORTLAND CEMENT ASSOCIATION
Dept. 5-13, 33 W. Grand Ave., Chicago, Ill.

A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

BUY DEFENSE STAMPS AND BONDS . . . SUPPORT THE RED CROSS

1942 to date Asst. Bridge Engr., DeWilde and Schwartz, Gen. Contrs.; 1939 to 1942 Draftsman, Engr. and Designer, Pine Brook Iron Works, and Draftsman, Detailer and Designer, Anthracite Bridge Co., both of Scranton.

Wax, Leslie (Junior), Brooklyn, N.Y. (Age 32) (Claims RCA 4.3 RCM 2.0) March 1936 to Oct. 1937 and Sept. 1941 to date Electrical Engr., T. Frederick Jackson, Inc.; in the interim Topographical Draftsman, Board of Transportation, and Eng. Asst., New York City Tunnel Authority.

Weikel, Stewart Frederick, Baltimore, Md. (Age 30) (Claims RCA 5.9) Jan. 1940 to date Engr., Van Rensselaer P. Saxe, Cons. Engr.; previously Engr., Acme Steel Eng. Co.; Eng. Draftsman, Whitman, Requardt and Smith, Engrs.; Engr. Draftsman, Designer and Engr., Sandlass and Wieman, Cons. Engrs.

Welton, Kenneth Earl (Junior), Chicago, Ill. (Age 29) (Claims RCA 4.0) March 1939 to date with Dept. of Subways and Superhighways, Chicago, Ill., as Shift Engr., and (since June 1940) Personal Asst. to Chf. Engr. and Commr. of Subways and Superhighways.; previously with WPA as Constr. Supt. (Class 3A); with Greeley & Hansen, Hydr. and San. Engrs., Chicago.

White, Henry Randall, Wilmington, Del. (Age 35) (Claims RCA 1.0) Jan. 1937 to date Civ. Engr., E. I. du Pont De Nemours & Co., Inc.

Wyant, Zint Elwin, Jr. (Junior), Topeka, Kans. (Age 32) (Claims RCA 8.2) June 1933 to date with Kansas Highway Comm., as Chainman, Plan Draftsman, Senior Instrumentman (Grade B), Draftsman, Senior Draftsman, Asst. Designer, Associate Engr. (Grades B and A) and (since July 1941) Senior Engr., Grade B (Squad Chf.), Bridge Design Dept.

APPLYING FOR JUNIOR

Beer, Robert George, Columbus, Ind. (Age 21) (Claims RCA 0.4) 1941 B.S. in Public Service Eng., Purdue Univ.; June 1941 to date Asst. San. Engr., Indiana State Board of Health.

Brown, Jay Robert, Columbus, Ind. (Age 31) (Claims RCA 0.1) 1942 B.S., Univ. of Ill.; July to Nov. 1930, June 1934 to Aug. 1937, summers 1938–1941 and Feb. 1942 to date with U.S. Engrs., as Sub-surveyman, Surveyman, Asst. Eng. Aide, and (since Feb. 1942) Jun. Engr.

Darmer, Kenneth Ivan, Jackson, Miss. (Age 23) 1939 B.S. in Civ. Eng., Univ. of Wis.; Dec. 1939 to date Jun. Hydr. Engr., U.S. Geological Survey.

Diker, Vejdi Rifat, Ankara, Turkey. (Age 27) (Claims RCA 2.5) Jan. 1940 to date Chf. Controlling Engr., Nafia Vekaleti, Ministry of Public Works; previously Military Service (compulsory); Chf. Control, Marash, Turkey; Engr., Bridge Div., Highway Dept., Ministry of Public Works, Ankara, Turkey.

Doolittle, Richard Neil, Denver, Colo. (Age 29) (Claims RCA 1.1) July 1937 to date with U.S. Geological Survey as Eng. Draftsman, Oil and Gas Leasing Div., and (since Aug. 1937) with Water & Power Div., as Eng. Draftsman, Jun. Engr. and Asst. Engr.; previously Eng. Draftsman, South Dakota Highway Comm., Pierre, S.Dak.

Gamer, Robert Lick, Sacramento, Calif. (Age 32) (Claims RCA 1.6) Sept. 1936 to Aug. 1937 and May 1938 to date (except March to Oct. 1941 Private, U.S. Army), with Bureau of Reclamation, as Geological Inspector, Jun. Geologist, and (since Feb. 1940) Asst. Geologist; in the interim Teaching Asst. (graduate student), Dept. of Geology, Univ. of California.

Hooker, John Tanner, Washington, D.C. (Age 24) (Claims RC 0.2 D 0.7) 1941 B.S. in Civ. Eng., Univ. of Tex.; Dec. 1941 to date Ensign D-V(S), U.S.N.R., on active duty; previously Jun. Engr., Austin Bridge Co., Dallas, Tex.

Hutchens, Harold Raymond, Kansas City, Mo. (Age 29) (Claims RCA 1.5 RCM 1.1) April 1941 to date with Marshall & Brown, Archts. and Engrs., in charge of structural design and engineering drafting department with full responsibility; previously with Ash-Howard-Needles & Tammen.

Kaufman, Arthur William, Reno, Nev. (Age 27) (Claims RCA 0.7) 1941 B.S., Univ. of Nev.; Aug. 1941 to date Asst. Prof. of Civ. Eng., Univ. of Nevada.

McKee, Robert Bradford, Buffalo, N.Y. (Age 29) Aug. 1936 to date with U.S. Engr. Dept., as Subsurveyman, Jun. Eng. Aide, Student Engr., and (since Jan. 1942) Jun. Engr.

Mohr, Alfred Becker, Linton, Ind. (Age 31) (Claims RCA 7.0) June 1937 to date Civ. Engr., Sherwood-Templeton Coal Co., Linton, Ind.

Morris, Gibson, Trinidad, B.W.I. (Age 26) Nov. 1941 to date Jun. Engr., James Stewart Co. Assoc.; Jan. to Oct. 1941 Jun. Engr., Zone 5, War Dept.; previously Jun. Engr., Georgia Highway Dept.; with Alabama Geodetic Control Survey.

Rau, Clyde Edward, College Station, Tex. (Age 26) (Claims RCA 0.8) 1941 B.S. in Civ. Eng., Agri. & Mech. Coll. of Tex.; July 1941 to date Civ. Engr. with W. S. Bellows Constr. Co. and Alfred C. Finn, Archt., Houston.

Stevenson, Edwin Bonnell, St. Paul, Minn. (Age 25) 1940 B.S. in Civ.Eng., Univ. of N.Dak.; Oct. 1940 to date Jun. Engr., U.S. Geological Survey; previously Asst. Street Engr., City of Superior, Wis.

1942 GRADUATES

GEORGE WASHINGTON UNIV.
(B.S. in Civ.Eng.)

	Age
Crossfield, Philip Jehiel	(26)

UNIV. OF ILL.
(B.S. in C.E.)

Campbell, Clyde Cecil	(29)

UNIV. OF KY.
(B.S. in C.E.)

Forston, William Carroll, Jr.	(23)

COLL. OF CITY OF N. Y.
(B.C.E.)

Ephros, Abraham	(23)
Farrell, Robert Edward	(21)
Forns, Joseph Maria	(21)
Grasso, Anthony Joseph	(20)
Lefkowitz, Solomon	(22)
Solomon, Sheldon Kirsner	(21)
Weber, Murray	(20)

W.VA. UNIV.
(B.S.C.E.)

Ramsey, Emory Fred	(24)

The Board of Direction will consider the applications in this list not less than thirty days after the date of issue.

Engineering Societies Personnel Service, Inc.

NEW YORK 31 W. 39TH ST.
CHICAGO 211 W. WACKER DR.
DETROIT 100 FARNSWORTH AVE.
SAN FRANCISCO 57 POST ST.

The items listed below have been furnished by the Engineering Societies Personnel Service, Inc., which is under the joint management of the Four Founder Societies. This service is available to members and is operated on a cooperative, non-profit basis. In applying for positions advertised by the Service the applicant agrees, if actually placed in a position through the Service as a result of these advertisements, to pay a placement fee in accordance with the rates as listed by the Service. These rates have been established in order to maintain an efficient, non-profit personnel service and are available upon request. This also applies to registrants whose notices are placed in these columns. All replies should be addressed to the key numbers indicated and mailed to the New York Office.

A weekly bulletin of engineering positions open is available to members of the cooperating societies at a subscription of $3 per quarter or $10 per annum, payable in advance.

MEN AVAILABLE

Graduate Civil Engineer; Jun. Am. Soc. C.E.; 26; married; 2 years experience in structural steel and reinforced concrete design; 2 years of municipal engineering including design and surveying on sanitary sewer, storm sewer, and paving projects. Prefer South or West Coast. Available two weeks notice. C-916.

Graduate Civil Engineer; Jun. Am. Soc. C.E.; 24; married; 2 years experience in construction of cantonment, air field, and air depot, with constructing quartermaster and U.S. Engineer Corps. Can handle responsible position. Prefer Eastern location. Available on a month's notice. C-917.

Civil Engineer; Jun. Am. Soc. C.E.; 26; married; B.S. degrees in C.E. and E.E.; registered engineer, State of Georgia; U.S. Civil Service rating of Jun. C.E. and E.E.; Assistant C.E.; 6 years intensive experience in road and bridge design, location, and construction, mill building design and construction, instrument and layout work, water supply, railroad layout and construction, office engineering including estimates and statements. C-918.

Civil Engineer; Assoc. M. Am. Soc. C.E.; 40; married; 17 years experience on railroad maintenance, surveys, mapping, stream flow measurements, concrete design, estimating, and construction. Now employed, but wishes to make permanent connection with responsible firm. C-919.

Research Engineer; Jun. Am. Soc. C.E.; 30; single; 7 years experience in engineering research, particularly dynamics and fluid mechanics. Good theoretical background from 5 years of teaching mechanical engineering in major university. M.S. degree in civil engineering. Location preferred, Continental United States. C-920-423-A-3 San Francisco.

Instructor; Assoc. M. Am. Soc. C.E.; desires position as assistant professor of surveying or sanitary engineering; several years teaching surveying and drawing. Master's degree and some teaching in sanitary engineering. C-921.

POSITIONS AVAILABLE

Structural Designers and Draftsmen for structural design staff on the design of new bridge structures involving both reinforced concrete and steel construction. Salary open. Headquarters, Pennsylvania. Y-9576.

Civil and Structural Engineer with experience in stress analysis and design of timber trusses, bridges, and other structures; in timber building construction and design; in materials testing laboratory and in research on wood and wood structures. Postgraduate education in mechanics and structural analysis desired. Salary, $3,800–$5,600 a year. Location, Middle West. Y-9589.

Structural Engineers (*a*) who have had experience in structural steel building design of a nature similar to that employed in power plant construction. Salary, $2,860–$4,420 a year. Location, Massachusetts. Y-9628.

Construction and Steel Designer with experience (general and industrial) for industrial plant work. Permanent. Location, New York, N.Y. Y-9653.

Chief Engineer who has had experience on miscellaneous buildings, roads, sewers, etc., for a large camp. Salary, about $6,000 a year. Headquarters, Pennsylvania. Y-9667.

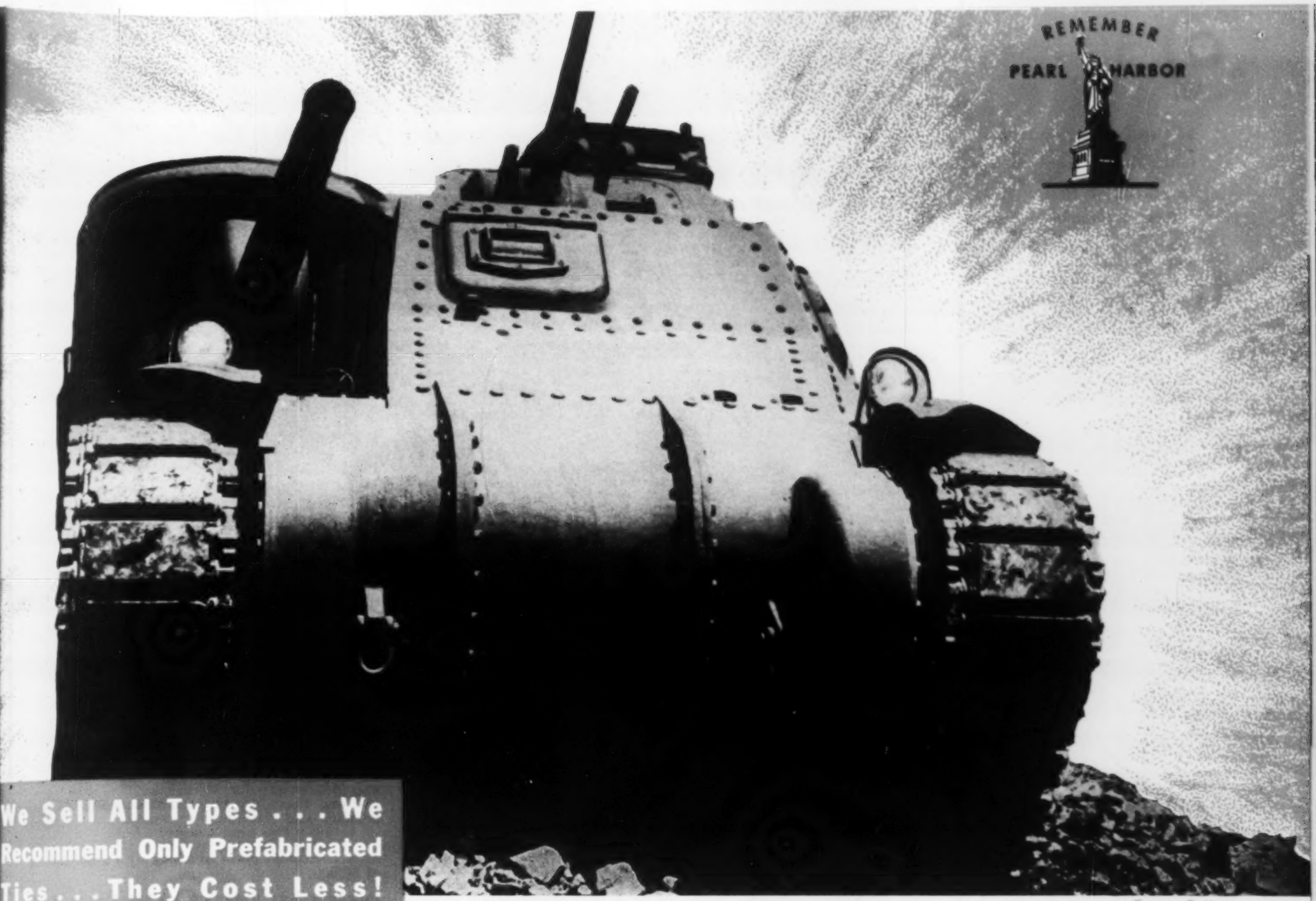
Designers and Draftsmen who have had experience on water, sewer, and road work for a large camp. Headquarters, Pennsylvania. Y-9668.

Field Engineer familiar with problems arising in connection with large tunnel construction. Location, South. W-163.

Assistant Engineer—Field, to make cutting and bending schedules for reinforcing steel; take off building construction quantities; in general, various construction materials. Must have had experience in steel work connected with reinforced concrete construction. Salary good but depending upon qualifications. Location South. W-219.

Erection Engineer who has had some construction experience. Will be required to erect and maintain diesel drives, pumps, concrete mixers, and other construction machinery. Salary open. Duration, temporary. Location, New York, N.Y. W-231.

Senior and Junior Engineers, graduate civil engineers or possibly mechanical, with training or experience in public administration, preferably experience in the design or construction of municipal public works. Should have a good working knowledge of the principles and practices of civil engineering, of the theory and practices of land surveying, construction methods and procedures, and engineering computations



Ewing Galloway

We Sell All Types . . . We Recommend Only Prefabricated Ties . . . They Cost Less!

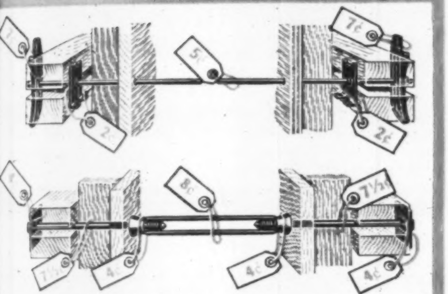
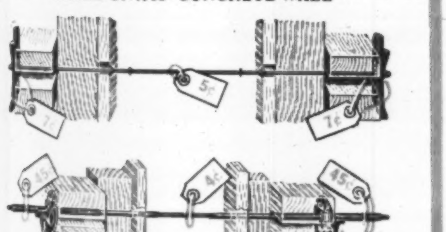


Figure it for yourself!
HERE ARE THE PRICES*

ALL PRICES F.O.B. BROOKLYN, N. Y.
*BASED ON A 12" CONCRETE WALL



CLANK! CLANK! CLANK!

THE TANKS ARE MARCHING!

Way back where glowing steel billets bloom, is the starting place for that "Big Parade" of tanks, so essential to our National Victory. Could be, that monster you see in the picture is made of steel saved by some builder or contractor, who abandoned, the wasteful practice of using "make-shift", "home-made" wire, band or rod ties, and turned to Richmond's complete line of more than 85 different prefabricated devices specifically engineered to meet every concrete form-tying need. For, you see—

Richmond Makes 1 Ton of Steel Do the Work of 3 Tons

—and that's not all! The "Richmond Way" is the profit making way on any sort of concrete job, because it gives you advantages available nowhere else. Advantages that mean a better, faster job at less cost and with greater profit. *For instance*, Richmond form-tys help you erect and strip your forms in less time. *For instance*, from our technical and estimating service you get, without cost, a job plan showing the number and location markings of the ties needed for each section. *For instance*, you do not tie up your funds in working parts such as Tylags, Tycones, Flat Washers, Tywrenches, etc. Richmond loans them to you! We're not just selling products or devices. From Richmond you get a service, a method, a way by which you can make many an unexpected dollar—and gain a name for contributing vitally to the "stock-piles" of steel for armaments. Specific figures to back-up all these statements are yours for the asking.

RICHMOND SCREW ANCHOR CO., INC.

and estimates. Must be able to supervise the work of others, and must have statement of deferred draft status. Salaries: Junior, \$1,920–\$2,280 a year; Senior, \$2,400–\$2,760 a year. Location, New Jersey. W-235.

Cost Engineers, 45–50, who can work up costs for buildings and heavy construction. Salary open. Locations, British Guiana and Trinidad. W-241.

Civil Engineer capable of designing small dams in earth or concrete, gravity water supply systems, earthwork, roads, grading, docks, and similar projects. Should also be a competent draftsman. Preferably draft exempt. Duration, about one year. Location, West. W-258.

Assistant Construction Engineers, 30–35, who have had considerable experience on highway construction, drainage, excavation, etc. Will be required to assist construction superintendent make reports, etc. Duration, 6 to 10 months. Salary, \$6,000 a year. Location, South America. W-291.

Designers for structural work—all kinds. Company needs structural, electrical, and mechanical men. Man with experience in wooden trestle work also desired. Location, Florida. W-292.

Structural Designers experienced in either steel, timber, or concrete. Salary, \$4,680 a year. Location, South Carolina and Georgia. W-303.

Engineers, Draftsmen, Detailers, etc., with experience or education which might be of assistance in the aeronautical field, who are qualified in one of the following: Building experience in aeronautics with a lapse of years intervening, experience in plywood construction, general knowledge of wood construction, practical experience in structural analysis, or experience in civil engineering. Headquarters, New York, N.Y. W-315.

Designer of timber structures who can also supervise their fabrication and erection, office, factory, and field. Man without special experience in this line but with sufficient related experience and ambition to adapt himself quickly would be considered. Permanent. Salary open. Location, New York, N.Y. W-318.

Draftsmen, structural, mechanical, electrical, not over 55, for detailing operations on marine work. Experience in hull, ship layout, or outfitting desirable. Salary, up to \$4,800 for 40-hour week. Location, western Pennsylvania. W-320.

Designer, mechanical or civil engineer, to supervise draftsmen and layout for fabricated structural steel plant. Salary, \$5,000 a year. Location, New York, N.Y. W-322.

Rodmen, Chainmen, Transitmen, and Chief of Party for airport construction work in Georgia, Louisiana, and Alabama. Salaries, \$1,800–\$4,200 a year for a 48-hour week. Duration, about one year. W-323.

Instructor in hydraulics, water supply, and sewerage disposal for a small Middle Western university. Salary, \$2,000–\$2,400 a year. W-328.

Engineers. (*a*) Civil Engineers with a background of general engineering experience and specialization in building construction; also younger men. (*b*) Sanitary Engineer with experience in water supply and sewage treatment work. All engineers should be of administrative or office type rather than field construction superintendent type. Salaries, \$3,200–\$5,000 a year. Must be either exempt from the draft or have low priority. Location, Washington, D.C. W-331.

Instructor for civil engineering department. Should be able to teach photogrammetry and surveying or handle the mechanics of materials and hydraulic laboratory work. Permanent. Location, New York, N.Y. W-336.

RECENT BOOKS

New books of interest to Civil Engineers donated by the publishers and filed in the Engineering Societies Library, or in the Society's Reading Room, will be found listed here. The notes regarding the books are taken from the books themselves and are edited by members of the staff of the Society or of the Library. Those books which are in the Library may be borrowed by mail by Society members for a small handling charge.

Chemical Engineering Plant Design. (Chemical Engineering Series), 2 ed. By F. C. Vilbrandt. McGraw-Hill Book Co., New York and London, 1942. 452 pp., diagrs., charts, tables, maps, $9^1/_2 \times 6$ in., cloth, \$5.

This volume analyzes the fundamental principles and factors involved in the development of a technically and economically efficient plant process from the laboratory stage through the pilot plant stages to the unit of commercial size. The author discusses such topics as foundations, drainage, piping, pumps, flow diagrams, equipment selection, plant layout, and power. The last two chapters deal with preconstruction cost accounting and plant location.

Elastic Energy Theory, 2 ed. By J. A. Van den Broek. John Wiley & Sons, New York; Chapman & Hall, London, 1942. 298 pp., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, \$4.50.

The theory of elastic energy as an instrument for the solution of problems involving statically indeterminate structures is presented as a text for an elementary course in strength of materials. The graphical summation method is used, because of its more general character and ease of application. The book is designed to be of use to practical engineers as well as to college students.

Engineering Economic Analysis. By C. E. Bullinger. McGraw-Hill Book Co., New York and London, 1942. 359 pp., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, \$3.50.

The chief aim of this text on cost analysis as applied to engineering projects is to give students an understanding of the economic factors that are present in the engineering process. The four main parts of the book deal, respectively, with: The economy analysis, probable yield on the investment; the intangible analysis, consideration of human relations; the financial analysis, provision of funds; and special methods and applications.

Engineering Surveys: Elementary and Applied. By H. Rubey, G. E. Lommel, and M. W. Todd. The Macmillan Co., New York, 1942. 664 pp.; logarithmic and trigonometric tables, 146 pp.; index, 24 pp.; illus., diagrs., charts, maps, tables, 8×5 in. cloth, \$4.50.

The elementary part of this book is identical with *Engineering Surveys: Elementary* by the same authors, and includes descriptions and methods of use of surveying instruments, computations, records, and basic survey procedures. The additional material deals with the application of these principles in mapping, photogrammetry, hydrographic surveying, and underground and mine surveying, and includes a chapter on the legal principles of boundary surveying.

Great Britain, Department of Scientific and Industrial Research, **Building Research. Wartime Building Bulletin** No. 19. Economy of Timber in Building. His Majesty's Stationery Office, London, 1942. 16 pp., diagrs., tables, $11 \times 8^1/_2$ in., paper (obtainable from British Library of Information, 30 Rockefeller Plaza, New York, 30 cents).

This bulletin discusses ways in which further economy can be achieved in the use of timber in building. Recommendations for the guidance of designers, manufacturers, and contractors are set out with several detail sketches illustrating particular points.

Heating, Ventilating, Air Conditioning Guide 1942, Vol. 20. American Society of Heating and Ventilating Engineers, 51 Madison Ave., New York, 1942. 1160 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, \$5.

The new edition of this valuable reference work follows the pattern of preceding ones. Section one presents the essential technical data for heating, ventilating, and air conditioning. This section has been thoroughly revised and largely rewritten to include recent information. Section two contains catalog data by many manufacturers of equipment. Section three is the membership list of the Society.

Hydraulics, 5 ed. By G. E. Russell. Henry Holt & Co., New York, 1942. 468 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, \$4.25.

The fundamental principles of hydraulics are presented in a clear, logical manner for students and for use as a reference book by engineers. Although the text is devoted mainly to hydraulics, the flow of other liquids and of compressible fluids is briefly discussed. The basic text material has been completely revised for the first time since 1925, and the chapters on hydraulic turbines and centrifugal pumps, added in the previous edition, have been brought up to date.

Industrial Waste Treatment Practice. By E. F. Eldrige. McGraw-Hill Book Co., New York and London, 1942. 401 pp., illus., diagrs. charts, tables, $9^1/_2 \times 6$ in., cloth, \$5.

Until now, the available information on the treatment of industrial waste has been widely scattered and badly in need of organization. The present work endeavors to do this, on the basis of the author's experience and the literature. The general principles of waste-treatment methods and equipment are first discussed, after which specific industries are considered, such as milk products, canning, tanning, pulp and paper making, oil refining, etc. Prominence is given to the design of structures for full-scale treatment.

Interpretation of Geologic Maps and Aerial Photographs. By A. J. Eardley. Edwards Brothers, Ann Arbor, Mich., 1941. 99 pp., illus., diagrs., charts, maps, tables, 9×6 in., paper, \$1.50.

This textbook, based upon a course given at the University of Michigan, provides an undergraduate course in the interpretation of geological maps and aerial photographs. It aims to present briefly the principles of map interpretation by means of realistic illustrations with short explanations; to present the principles of geologic interpretation of aerial photographs; and to describe the use of such photographs in field mapping.

An Introduction to Historical Geology, with Special Reference to North America, 5 ed. By W. J. Miller. D. Van Nostrand Co., New York, 1942. 499 pp., illus., diagrs., charts, maps, tables, $9^1/_2 \times 6$ in., cloth, \$3.50.

Extensive revision has again modernized this standard text, which is a companion volume to the author's *Introduction to Physical Geology*. Beginning with a general treatment of fundamentals (fossils, rock formations, etc.), the author proceeds to develop the physical history and corresponding life of the successive geological divisions.

Modern Plywood. By T. D. Perry. Pitman Publishing Corp., New York and Chicago, 1942. 366 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, \$4.50.

All phases of the plywood industry are covered in this comprehensive work. A brief history of the development of plywood precedes section dealing with the advantages and characteristics of modern plywood and the adhesives used in its construction. The manufacture of veneers and plywood is covered in detail, and industrial uses are described. Grading rules, a glossary of trade terms, and an extensive classified bibliography are also included.

Operation of Sewage-Treatment Plants. By W. A. Hardenbergh. International Textbook Co., Scranton, Pa., 219 pp., illus., diagrs., charts, tables, $7^1/_2 \times 5$ in., cloth, \$2.50.

In part one of this practical text, the author discusses general considerations of sewage treatment and procedures for sewage analysis. In parts two and three, the equipment and processes for primary and secondary treatment are described in detail. The final chapter presents operating data, with sample report sheets, for a trickling-filter treatment plant in a city with a population of 80,000.

Power Plant Engineering and Design, 2 ed. By F. T. Morse. D. Van Nostrand Co., New York, 1942. 703 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, \$6.50.

The aim of this book is to present in one volume a study of electric generating stations, including public service, industrial, and institutional plants. Steam plants are given most attention, but hydroelectric and diesel-engine plants are also considered. The text assumes a basic knowledge of thermodynamics and mechanics and omits minor details of plant equipment and layout.

Reinforced Concrete, Theory and Design. By J. E. Kirkham. Edwards Brothers, Inc., Ann Arbor, Mich., 1941. 428 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, \$3.75.

Fundamental principles involved in the designing of reinforced concrete structures are presented in a simple, practical manner. By the direct application of simple mechanics in terms of known loads and strengths, the author provides design procedures for beams, slabs, columns, retaining walls, tanks, bridges, and buildings. The book is intended for both students and practicing engineers.

Safety Supervision (Pennsylvania State College, Industrial Series). By V. G. Schaefer. McGraw-Hill Book Co., New York and London, 1941. 352 pp., tables, $7^1/_2 \times 5$ in., cloth, \$2.50.

The purpose of this book is to discuss the human element involved in the problems of the supervisor who must promote the safety of the workers in his division. It presents the duties, responsibilities, methods, and techniques of safety supervision as elements of personnel management, and makes no attempt to discuss engineering problems of safety or the making of accident records and reports.

The Science and Practice of Welding. By A. C. Davies. The Macmillan Co., New York; University Press, Cambridge, England, 1941. 436 pp., illus., diagrs., charts, tables, 8×5 in., cloth, \$2.25.

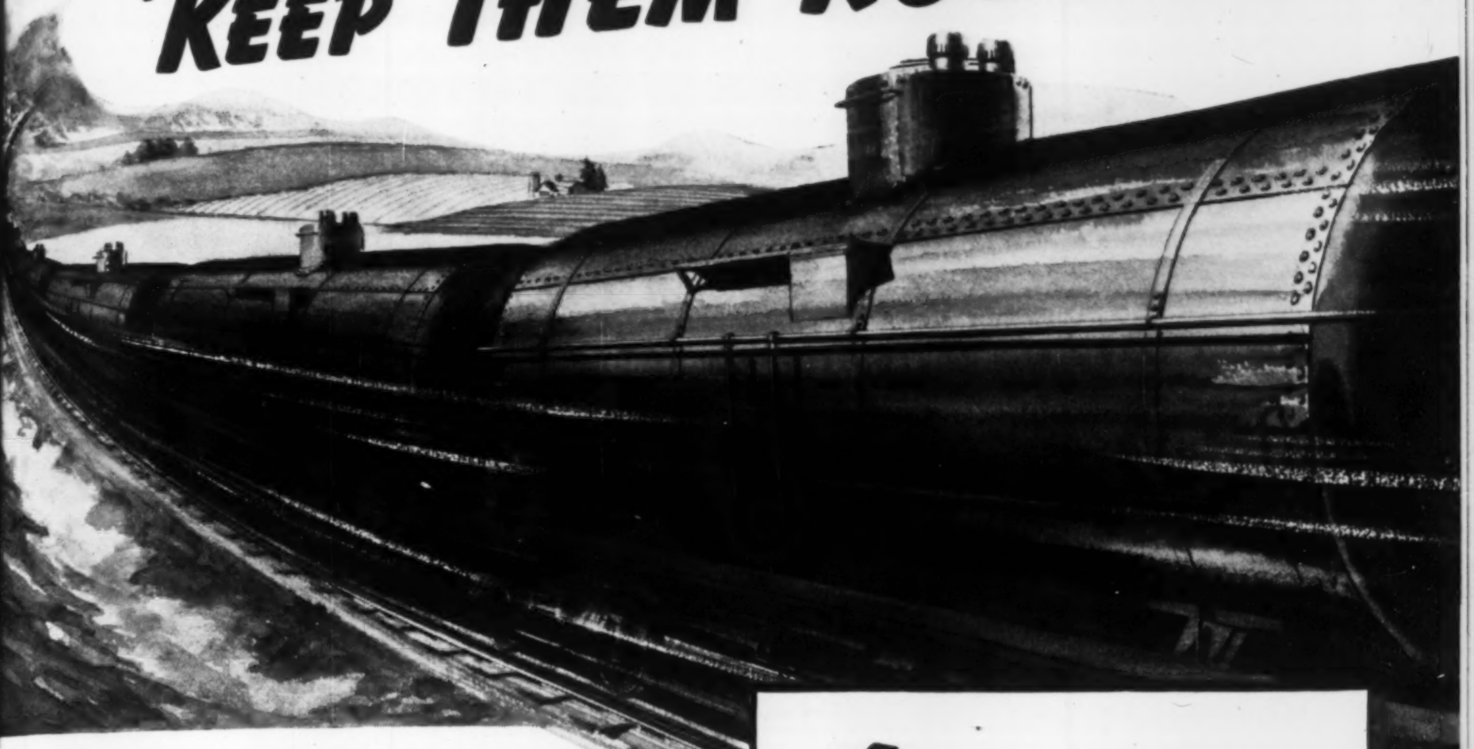
This text provides a concise, yet comprehensive, account of the basic theoretical principles underlying the various processes of welding and of the practical methods of applying them. Both gas and electric methods are covered, and there are chapters on gas cutting and on inspection and testing.

Sixty Years a Builder, the Autobiography of Henry Ericsson, written in collaboration with L. E. Myers. A. Kroch & Son, Chicago, 1942. 388 pp., illus., $9^1/_2 \times 6$ in., cloth, \$3.50.

The author emigrated to Chicago from Sweden in 1882. Beginning as a bricklayer, he rose to be a prominent contractor who erected many large buildings and served for several years as building commissioner of the city. In addition to its interest as a biography, the book throws much light on the history of building development, especially in Chicago.

TANK CARS ARE VITAL TO VICTORY...

"KEEP THEM ROLLING"



... AND SPEED YOUR OWN ASPHALT DELIVERIES, TOO!

● Today, unprecedented quantities of bituminous materials are urgently needed for defense highways, airports and access roads. Tank cars for asphalt deliveries are vitally important. How can these increased demands be met with the limited supply of cars available?

You can help answer that—and speed your own asphalt deliveries, as well. Keep your tank cars rolling. There are four simple ways suggested here. The Standard Oil Asphalt representative in your locality will work with you in developing plans to meet this emergency. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the representative nearest your job.

OIL IS AMMUNITION USE IT WISELY

4 ways you can help keep tank cars rolling

1. **Accurately estimate your asphalt needs** when placing yearly contracts. An extremely high estimate may force your supplier to hold large stocks and delivery facilities open which others might need.

2. **Carefully plan delivery schedules,** as far in advance as possible, so that your supplier and your railroad can be sure that transportation is available when you want it.

3. **Speed up unloading** by scheduling deliveries when your crews and equipment are available.

4. **Release empty cars.**

Copyright 1942, Standard Oil Company (Ind.)

ASPHALT FOR EVERY PURPOSE

STANDARD OIL COMPANY
(INDIANA)

CURRENT PERIODICAL LITERATURE

Abstracts of Articles on Civil Engineering Subjects from Publications (Except Those of the American Society of Civil Engineers) in this Country and Foreign Lands

Selected items for the current Civil Engineering Group of the Engineering Index Service, 29 West 39th Street, New York, N.Y. Every article indexed is on file in The Engineering Societies Library, one of the leading technical libraries of the world. Some 2,000 technical publications from 40 countries in 20 languages are received by the Library and are read, abstracted, and indexed by trained engineers. With the information given in the items which follow, you may obtain the articles from your own file, from your local library, direct from the publisher, or they may be borrowed from the Engineering Societies Library. Photoprints will be supplied by this library at the cost of reproduction, 25 cents per page to members of the Founder Societies (30 cents to all others), plus postage, or technical translations of the complete text may be obtained at cost.

BRIDGES

Bascule, Ireland. New Bascule Bridge in Dublin. *Ry. Gaz.*, vol. 76, no. 8, Feb. 20, 1942, pp. 271–272. Description of recently erected drawbridge at Sheriff Street, lifting span of which is balanced by overhead balance arm and operated electrically; foundations and foundation frame; main lifting span; lifting links and rocker girders; mechanical equipment; method of operation; interlocking and other electrical equipment.

Concrete Arch, Switzerland. Le pont en béton armé du Furstenland, près de St. Gall. *Bul. Technique de la Suisse Romande*, vol. 67, no. 23, Nov. 15, 1941, pp. 274–275. Brief description and some technical data on reinforced concrete arch bridge at Furstenland, Switzerland, replacing old two-arched bridge built 130 years ago; new bridge has span of 135 m and is 45 m high; St. 37 and 54 was used for frame work.

Concrete Girder, India. Long Road-Bridge in India, S. N. Kapur. *Concrete & Constr. Eng.*, vol. 36, no. 3, Mar. 1941, pp. 127–130. Details of deck-girder bridge of unusual length constructed over rivers Chenab and Jhelum close to new barrage at Trimmu; total length 3,275 ft; notes on falsework and shuttering and concrete placing; detail drawings included. From *Indian Concrete J.*, Sept. 15, 1940.

Design. Bridge Design and Construction, W. G. Bowman. *Eng. News-Rec.*, vol. 128, no. 3, Jan. 15, 1942, pp. 92–93. Review of most important bridges built during 1941 in which trend was toward improved designs in short-span bridges; notes on revised bridge specifications published by American Association of State Highway Officials.

Railroad. Standard Railway Bridges. *Ry. Gaz.*, vol. 76, no. 4, Jan. 23, 1942, pp. 118–119. Standard design has been adopted by British railways for use in replacement of damaged underbridges; supply of standard spans obtained which can be used for replacing such bridges; these (spans) are designed to fit any opening between 40 and 80 ft, and are adaptable for any angle of skew; illustrations and diagrams.

Steel Arch, St. Georges, Del. Tie Dominates Rib in St. Georges Arch, M. N. Quade. *Eng. News-Rec.*, vol. 128, no. 1, Jan 1, 1942, pp. 22–26. New crossing of Chesapeake and Delaware Canal at St. Georges, Del., is 540-ft span tied arch, but in contrast to usual practice tie is heavy member and arch rib light one; of box section 108 in. deep, tie resists most of live load moment and serves as stiffening girder for arch rib; advantages of this type of span appear in simpler details, easier erection, and in possible small saving in steel.

Steel, Welding. Application of Welding to Bridge Maintenance, C. W. Brett. *Civ. Eng.* (London), vol. 36, no. 425, Nov. 1941, pp. 618–620. Welding as applied to maintenance and repair of steel bridges, provides efficient solution to securing increase in strength to carry heavier loads, overcoming weakness arising from corrosion and age generally, and dealing with damage brought about by enemy action; specific repairs dealt with.

Steel, Welding. Die Entwicklung der Brueckenschweissung in den letzten drei Jahren, K. Brueckner. *VDI Zeit*, vol. 85, no. 20, May 17, 1941, pp. 460–462. Development in welding of steel bridges during last three years; influence of tests, carried out after collapse of two bridges, on requirements of structural steel; development in design, construction, and welding procedure; costs.

Steel, Welding. New Tests on Welded Bridge Girders. *Ry. Gaz.*, vol. 75, nos. 25 and 26, Dec. 19 and 26, 1941, pp. 652–653. Important German tests to ascertain causes of bridge failures and to indicate future precautions.

Suspension, Hidalgo, Tex. Hidalgo-Reynosa Bridge Rebuilt, J. W. Beretta. *Eng. News-Rec.*, vol. 127, no. 25, Dec. 18, 1941, pp. 890–891. Suspension bridge over Rio Grande at Hidalgo, Tex., collapsed in 1939 because of failure of two cables, presumably due to corrosion stimulated by electrolytic action on cables within anchorage; bridge now has been rebuilt with new anchorages designed to prevent recurrence of electrolytic corrosion; provision has been made to neutralize induced currents.

Widening. Widening Steel and Concrete Bridge. *Eng. News-Rec.*, vol. 128, no. 7, Feb. 12, 1942, pp. 254–256. In South Carolina, roadways on two through-truss steel spans and thirteen concrete deck girder spans were widened from 18 to 24 ft without reduction of their capacity below H-15 loading; use of concrete filled steel grid floor on steel spans produced dead load stresses in rebuilt truss members less than those in original structure; widened truss spans were carried on cantilever caps on old piers.

Wind Stresses. Aerodynamic Forces Acting on Suspension Bridges and Their Effect in Producing Oscillations. *Roads & Bridges*, vol. 79, no. 12, Dec. 1941, pp. 24–25, 56–57, 60–64, and 66. Discussion and classification of aerodynamic forces acting on suspension bridges; static horizontal and vertical wind forces; dynamic forces due to turbulence, eddy formation on structure, and oscillation of structure; aerodynamic forces produced by vertical and angular oscillations.

Wooden. Attention Turned to Timber Bridges by Priorities on Structural Steel, W. C. Hopkins. *Eng. News-Rec.*, vol. 128, no. 7, Feb. 12, 1942, pp. 279–284. Studies made in Maryland to develop satisfactory low-cost bridge for many water crossings in state, show that structures made of treated timber or composite structures of treated timber and concrete have possibilities in low-cost, long, and satisfactory service and pleasing appearance not generally realized; tests on composite decks indicate that they may be found useful for major bridges.

Wooden, Dutch East Indies. Houten bruggen in Zuidwest-Celebes, W. J. G. Paardekooper. *Ingenieur in Nederlandsch-Indie*, vol. 8, no. 1, Jan. 15, 1941, pp. II-1–II-4, supp. plates. Wooden bridges in southwestern Celebes Island, Netherlands East Indies; illustrated description.

Wooden. Pont en bois sur le Rhone entre Lavey et Saint-Maurice, L. Marguerat. *Bul. Technique de la Suisse Romande*, vol. 67, no. 24, Nov. 29, 1941, pp. 277–283. Rhone River wooden bridge between Lavey and Saint-Maurice, Switzerland; covered construction has three fields, 21 and 22 m, respectively, of total width of $5^1/_2$ m; details concerning foundation, working procedure, cost, and results of trial.

BUILDINGS

Balloon Houses. Western Contractor Building Balloon Houses. *Western Construction News*, vol. 17, no. 1, Jan. 1942, pp. 12–13. Illustrated notes on construction of housing project units by guniting inflated rubberized fabric forms.

Reconstruction. Place of Preservation in Reconstruction Programme, J. Summerson. *Roy. Inst. Brit. Architects—J.*, vol. 49, no. 2, Dec. 1941, pp. 24–28. Consideration of types of buildings which may in certain circumstances deserve protection. Before Arch. Assn.

Repair. Notes on Reparation Works, A. R. Warnes. *Soc. Chem. Industry—J. (Chem. & Industry)*, vol. 60, no. 51, Dec. 20, 1941, pp. 887–889. It is pointed out that reparation of ancient buildings, when carried out properly, needs application of knowledge of certain branches of chemistry, geology, and biology; examples which author has investigated; recent observations relative to action of incendiary bomb fires on some of building materials.

CITY AND REGIONAL PLANNING

Argentina. Un problema de Urbanismo, P. H. Braem. *Revista de Ingenieria*, vol. 35, nos. 9, 10, and 11, Sept. 1941, pp. 289–301; Oct., pp. 327–347; and Nov., pp. 360-367. Problem in city planning; general considerations; city planning and real estate; determination and control of value lines and price limits; calculation of theoretical value of position; town lot sizes and basic influence on prices; North American standards; position of lot in subdivisions; what has been done in Argentina; opinion of L. C. Berrini of San Pablo; and general summary. Bibliography.

Great Britain. Background to National Planning. *Nature* (London), vol. 3767, Jan. 10, 1942, pp. 31–34. Review of recent literature and Uthwatt report dealing with reconstruction schemes in Great Britain; stress on place of agriculture in planning policy; and concentration or dispersal of industry.

CONCRETE

Camps, Military. Developments in Concrete-Construction Methods, R. Hammond. *Engineering*, vol. 152, nos. 3962 and 3963, Dec. 19, 1941, pp. 481–482, and Dec. 26, pp. 501–503. Types of construction for rapid building of camps and similar work: KD type for sectional concrete hutting; Russell system of steel gusset plates and volts application; Orlit prestressed steel reinforcement for pre-cast units of vibrated concrete; J. H. de Walker system of cement and sand rendering on jute fabric; Patrick reinforced concrete huts; Flexiform roofing; and Coventry housing scheme for war workers.

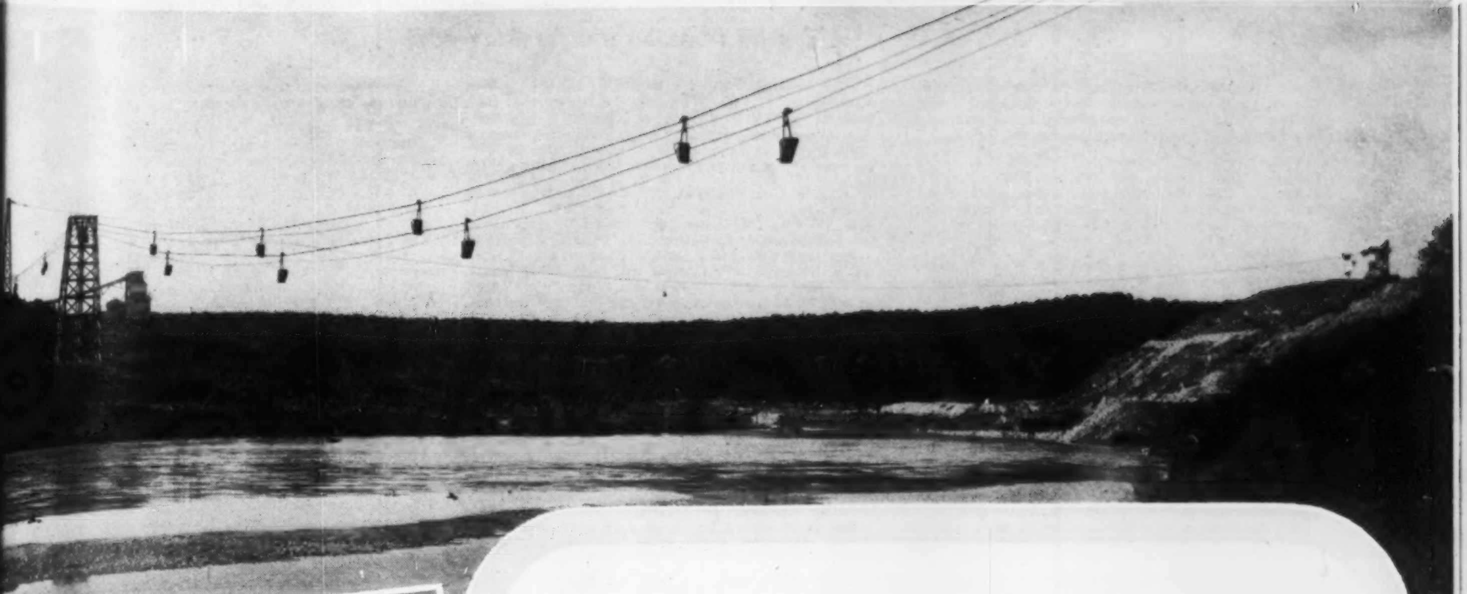
Columns, Design. Design Diagrams for Square Concrete Columns Eccentrically Loaded in Two Directions, P. Andersen. *Am. Concrete Inst.—J.*, vol. 13, no. 2, Nov. 1941, pp. 149–163. Paper presents fifteen diagrams which will give directly—for square columns with symmetrical reinforcement and eccentrically loaded—maximum compressive stress on concrete as well as maximum tensile stress in reinforcement without first determining position of neutral axis; diagrams can be used for sections reinforced with 4, 8, 12, or 16 bars.

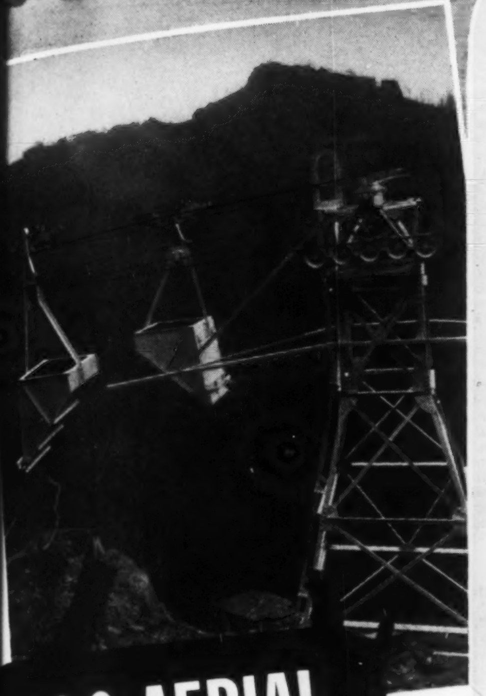
Concrete. Proposed Recommended Practice for Measuring, Mixing, and Placing Concrete, L. H. Tuthill. *Am. Concrete Inst.—J.*, vol. 13, no. 2, Nov. 1941, pp. 93–117. Report prepared in response to expressed need for outline of good practices for measuring and mixing ingredients for concrete and for placing finished product; best methods known are outlined rather than common practices.

Construction, Forms. Absorptive Form Lining, E. N. Vidal and R. F. Blanks. *Am. Concrete Inst.—J.*, vol. 13, no. 3, Jan. 1942, pp. 253–268. Development of wallboard type of absorptive form lining as practical means of eliminating defects and effecting other improvements in formed concrete surfaces; laboratory investigations made; field tests to determine practicability of method; purchase specifications; and experiences to date in using absorptive form lining in actual construction covered. Bibliography.

Construction, Standards. Concrete Specifications and Water Content of Concrete, F. J. Warberg. *Am. Concrete Inst.—J.*, vol. 13, no. 2, 1941, pp. 169–172. Paper is plea for specifying definite credits, accruing to owner for every failure of his contractor to meet specification requirements, heavy enough to make non-compliance unprofitable; and also plea to owners that competent, honest inspector is well worth his hire; test for water content of concrete after it has set suggested.

Creep. Effect of Change in Moisture-Content of Creep of Concrete Under Sustained Load, G. Pickett. *Am. Concrete Inst.—J.*, vol. 13, no. 4, Feb. 1941, pp. 333–355. Amount and rate of plastic flow in concrete under load have been found to depend upon rate of drying; mathematical analysis shows that this is natural consequence of non-uniform shrinkage and non-linear





U·S·S AERIAL
Wire Rope
TRAMWAYS

AMERICAN
TIGER BRAND
WIRE ROPE
AMERICAN STEEL & WIRE COMPANY

Take to the Air and get it there!

HERE, in U·S·S Aerial Wire Rope Tramways, we offer a system for transporting material that has proved its ability to deliver the goods regardless of ground barriers. Dependable, efficient and low in operating cost, it fills the bill where other methods of hauling and transportation are too expensive, too slow or just plain impossible.

Through inaccessible or rough terrain, over streams and other obstacles it moves as the crow flies. Fast, direct, independent of weather, it short-cuts distance and lowers handling cost. Snow, ice, rain or mud can not halt its operation.

This system is not only more reliable, but because of definite labor and power savings is economical as well. Operating costs may be brought below 2¢ or 3¢ per ton-mile, exclusive of amortization. The more difficult the ground conditions, the greater comparative savings it insures.

U·S·S Aerial Tramways have been built in lengths ranging from a few hundred feet to many miles, with capacities from 1½ to 300 tons per hour. The many types of U·S·S Aerial Tramways available provide a complete range to suit practically any condition of operation and service. Our engineering staff will gladly assist you in the selection of the system that will serve you most efficiently.

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
San Francisco
United States Steel Export Company, New York

UNITED STATES STEEL

stress creep relationship; it is further shown that shrinkage cannot account for additional creep unless inelastic strain not proportional to stress is produced; results from experiments reported.

FOUNDATIONS. "Concrete" Facts, J. McCombe. *Elec. Times*, vol. 101, no. 2616, Dec. 11, 1941, pp. 274–275. Concrete work in overhead line construction; preventing frozen concrete; placing of concrete in wet foundations.

NAILING. Nailing Concrete, P. Burbidge. *Commonwealth Engr.*, vol. 29, no. 4, Nov. 1, 1941, p. 93. Description of some recent experiments, incidental to other concrete tests, carried out in testing laboratory of Melbourne and Metropolitan Board of Works; very satisfactory nailing concrete was produced from ordinary sawdust from carpenter's shop, using mix of 1:1:2 cement, sand, and sawdust with 10% of Renniks flakes in gaging water

ROAD MATERIALS. Effect of Carbon Black on Strength of Mortar, D. O. Woolf. *Pub. Roads*, vol. 22, no. 10, Dec. 1941, pp. 231–233. Report of tests to determine effect of carbon black on strength of concrete at ages up to 1 year; carbon black is added to concrete to improve appearance and reduce glare; tension briquets and 2-in. cubes for compressive strength tests were made; results of these tests indicated that to age of 1 year, none of samples of emulsified carbon black tested caused any important reduction in strength of mortar.

ROADS AND STREETS. General Observations on Concrete Scaling, J. W. Kushing. *Roads & Streets*, vol. 84, no. 12, Dec. 1941, pp. 23–30. Study of scaling of concrete pavements—its causes and methods of prevention; results of field study, including survey of existent concrete pavements and special test road, and laboratory study of concrete durability; preliminary studies on aggregates, cements, and additives; action of chloride salts on concrete; laboratory freezing and thawing of specimens from test road.

ROADS AND STREETS. Trends in Concrete Highway Design, A. A. Anderson. *Eng. News-Rec.*, vol. 128, no. 7, Feb. 12, 1942, pp. 245–247. Trend away from frills in design of concrete pavements has been accelerated by war conditions; steel is being reduced or entirely eliminated by minor changes in slab section and by improved spacing of expansion and contraction joints; treatment of cements to reduce effect of chemicals and frost action on pavement surfaces shows promising results.

WALLS. Good Practice in Concrete Masonry Wall Construction, K. C. Tippy. *Am. Concrete Inst.—J.*, vol. 13, no. 4, Feb. 1942, pp. 317–328. Discussion of some of less understood but important details of concrete-masonry wall construction, which represent difference between ordinary and good construction; need for preshrinkage of moisture-laden masonry units before laying in wall; use of proper mortar; adequate footings and foundations; use of proper lintels and sills; etc.

CONSTRUCTION INDUSTRY

GREAT BRITAIN. Reconstruction and Architectural Profession. *Roy. Inst. Brit. Architects—J.*, vol. 49, no. 2, Dec. 1941, pp. 21–23. Interim report No. 4 of Royal Institute of British Architects Reconstruction Committee; relation between architectural and planning functions in reconstruction period; design and external appearance of buildings; status of official architect; building industry after war.

UNITED STATES. Current Construction Practice, H. W. Hunt. *Eng. News-Rec.*, vol. 128, no. 3, Jan. 15, 1942, pp. 105–106. Defense construction of past year has introduced new methods for drydock construction, stimulated prefabrication of building units, and caused extension of winter protection methods; most significant advances in civil work have been in subsurface construction.

DAMS

AUSTRALIA. Barrages Across River Murray in South Australia. *Dock & Harbour Authority*, vol. 22, no. 254, Dec. 1941, pp. 32–33. Details pertaining to barrages constructed across mouth of Murray River to make river permanently navigable to Echuca in State of Victoria, and to provide sufficient water for diversions of supply for irrigation and other purposes.

CONCRETE, CALIFORNIA. Enlargement of Alpine Dam. *Western Construction News*, vol. 16, no. 12, Dec. 1941, pp. 356–360. Marin Municipal Water District raises crest of 27-year-old structure 31 ft, doubling capacity; unique sliding joints devised to permit movement of new slab during cooling and settlement without stressing existing structure; contractor manufactures all aggregates including sand at quarry on job.

CONCRETE GRAVITY, WASHINGTON. Cement for Grand Coulee Dam, O. D. Dike. *Reclamation Era*, vol. 31, no. 10, Oct. 1941, pp. 276–277. Grand Coulee Dam, powerhouses, and pumping plant contain 10,500,000 cu yd of concrete which required nearly 11,000,000 bbl of bulk cement in addition to 190,000 bbl of sacked cement; notes on types and quantities of cement used; unloading, blending, and pumping cement to mixing plants.

CONVEYORS, BELT. World's Longest Belt Conveyor, G. L. Williams. *Reclamation Era*, vol. 31, no. 10, Oct. 1941, pp. 268–269. Particulars of belt conveyor, 10.8 miles long, which carries 20,000 tons per day of sand, gravel, and cobbles at rate of 6 miles per hour to Shasta Dam.

EARTH, CALIFORNIA. Building Cottage Grove Dam, M. Olds. *Pac. Builder & Engr.*, vol. 47, No. 12, Dec. 1941, pp. 28–31 and 55. Details of earth moving and concrete methods employed in construction of flood control dam on Coast Fork of Willamette River; dam will have total length of 2,095 ft including 264 ft long concrete spillway; it will be 24 ft wide at crest, and 400 ft at bottom.

MASONRY, UPLIFT. Uplift in Dams, S. Leliavsky. *Nature* (London), vol. 149, no. 3770, Jan. 31, 1942, pp. 137–138. Letter to editor describing experiments made for Projects Department of Ministry of Public Works, Egypt; results obtained are independent of theories about internal structure of material.

RESERVOIRS, COLD WEATHER PROBLEMS. Protecting a Reservoir Against Ice, H. J. Cook. *Water Works and Sewerage*, vol. 88, no. 12, Dec. 1941, p. 549. Outline of simple scheme that has proved effective at Augusta, Me.; protection consists of string boom of logs held about 3 ft from reservoir walls extending around whole perimeter to decrease effect of ice expansion.

RESERVOIRS, LEAKAGE. Locating and Stopping Leak in Water Works Dam, H. L. Field and C. L. Sterling, Jr. *Water Works & Sewerage*, vol. 88, no. 12, Dec. 1941, pp. 553–554. Leakage from upper reservoir through rupture in joint of 24-in. cast-iron pipe running through bottom of dam was located at Greenfield, Mass., by lowering uranine dye 50 ft to bottom of reservoir; 75 bags of sand, lowered directly in front of pipe, acted as plug that will remain until permanent sluice gate can be installed in spring.

ROCK-EARTH. Processing Plant for Rock-Earth Dam. *Eng. News-Rec.*, vol. 128, no. 5, Jan. 29, 1942, pp. 188–191. Contractor on Green Mountain Dam in Colorado developed unusual and effective processing plant for separating fines for impervious fill section from rock and cobbles for down-stream portion, both coming from glacial moraine borrow-pit; dam, part of Colorado-Big Thompson irrigation and power project, will be one of highest of its type in world, 310 ft from foundation to crest.

FLOOD CONTROL

RIVERS, DISCHARGE. Flow of Rio Grande and Tributary Contributions from San Marcial, New Mexico to Gulf of Mexico, 1940. *Int. Boundary Commission U.S. & Mexico—Water Bul., No. 10;* 111 pp. Compilation of stream discharges and related data of flow of international portion of Rio Grande; data on general hydrologic conditions for 1940, quantity of water, sources of flow, diversions from Rio Grande, quality of water, floods, rainfall, evaporation, drainage basin, and irrigated areas.

FOUNDATIONS

DRIVING CONCRETE PILES. Two-Pipe Pile Jetting Rig Speeds Driving on Navy Pier Job. *Eng. News-Rec.*, vol. 128, no. 5, Jan. 29, 1942, p. 200. New pier being built at important Navy yard requires some 2,000 concrete piles, which are being put down with minimum of driving effort by using two jets—one on either side of pile, and each combining high pressure water and air.

DRIVING STEEL PILES. Big Rigs Drive Cofferdam Piles, J. W. Peerson. *Eng. News-Rec.*, vol. 128, no. 5, Jan. 29, 1942, pp. 194–199. Driving of 19,500 tons of steel sheetpiling, 80 to 100 ft long, for first stage of cellular cofferdam at TVA's big Kentucky Dam was done by pair of four-hammer rigs, two gantries, and two crawler cranes traveling on trestle; floating drivers and cranes aided land equipment; steel pipe templates spotted sheets for forming cells.

PROBLEMS. Foundations, R. R. Minikin. *Engineer*, vol. 172, nos. 4484 and 4485, Dec. 19, 1941, pp. 428–430, and Dec. 26, pp. 448–450. Presence of water in soil gives rise to most of difficult foundation problems, and structures that have to withstand heavy lateral forces, such as retaining walls or dams, are most exercising in this respect; comparison of Rankine theory of earth pressure with wedge theory propounded by author; in latter, allowance is made for downward force of vertical component of inclined thrust on back of wall, which considerably assists stability.

HYDROELECTRIC POWER PLANTS

RIVER DEVELOPMENT. Power Dominates River Development, H. W. Richardson. *Eng. News-Rec.*, vol. 128, no. 3, Jan. 15, 1942, pp. 101–104. Hydroelectric output stepped up to meet defense needs; flood control continues in important industrial areas; navigation greatly increased but irrigation has been largely deferred as "post-war."

SOUTH CAROLINA. Santee Diverted to Cooper for Tidewater Hydro, L. H. Hardin. *Elec. World*, vol. 117, no. 2, Jan. 10, 1942, pp. 33–34. Unique features of Santee-Cooper development are: 75-ft head utilized less than 30 miles from tidewater, construction of 27 miles of earth dikes 75-ft lift for navigation lock, and highly flexible means for pairing combinations of generators and lines to meet any likely character of load.

TENNESSEE VALLEY AUTHORITY, EMERGENCY PROGRAM. Emergency Program of TVA, T. B. Parker. *Eng. News-Rec.*, vol. 127, no. 25, Dec. 18, 1941, pp. 866–870. Intensive construction of new power plants and storage reservoirs has been undertaken by Tennessee Valley Authoritiy to meet growing power needs of defense industries in Tennessee basin; work now in progress under emergency authorization is outlined and progress on projects in Hiwassee River basin, chief center of emergency construction operations of TVA, is given.

HYDROLOGY AND METEOROLOGY

EARTHQUAKES, CALIFORNIA. California Earthquakes of Mission Period, 1769–1838. *Calif. J. Mines & Geology*, vol. 37, no. 2, Apr. 1941, pp. 219–223. Brief summary, with data attested in various historical records such as explorers' journals, mission records, etc.; earliest record is in journals of Portola expedition of 1769. Bibliography.

EARTHQUAKES, CALIFORNIA. Earth Motions in Vicinity of Fault Slip, N. H. Heck and F. Neumann. *Geol. Soc. America—Bul.*, vol. 53, no. 2, Feb. 1, 1942, pp. 179–193. Data are submitted for Imperial Valley earthquake of 1940 and Long Beach earthquake of 1933; ground displacements were not recorded directly but obtained by mathematical treatment of seismograph acceleration records; doubt is thrown on presence of really dominant wave periods during earthquake in California.

WAVES, OCEAN. Wave Action and Movement of Beach Sediments, O. F. Evans. *Shore & Beach*, vol. 9, no. 4, Oct. 1941, pp. 108–109. Notes on laws governing movements of sediments on beaches and subaqueous terraces of oceans and lakes from viewpoint of engineer and geologist.

INLAND WATERWAYS

RIVERS, IMPROVEMENT. Putting a River Underground. *Eng. News-Rec.*, vol. 128, no. 5, Jan. 29, 1942, pp. 180–183. Pile foundations through soft muck, large traveling forms for concrete construction, and use of "triple" concrete pump with discharge line carried on boom of big crane are highlights of building twin pressure conduits (30 by 19 ft) to carry park river underground through Hartford, Conn.; access road from new Connecticut River bridge and bypass highway will enter business district over conduit.

IRRIGATION

CANALS, DISCHARGE. Construction Design Chart—LXXII . . . Earth Ditch Discharge—3-ft Bottom, J. R. Griffith. *Western Construction News*, vol. 16, no. 12, Dec. 1941, p. 368. Alinement chart for computation of discharge from ditch having bottom width of 3 ft and side slope of 1 on 1$^1/_2$; numerical examples.

LAND RECLAMATION AND DRAINAGE

GRAND COULEE PROJECT. Clearing Grand Coulee Reservoir. *Power Plant Eng.*, vol. 46, no. 2, Feb. 1942, pp. 54–56. Some data on operations undertaken when clearing 54,000 acres of rugged and timbered terrain, which will form reservoir 151 miles long when waters reach ultimate height; 10 million man hours spent in labor in 2$^1/_2$ years.

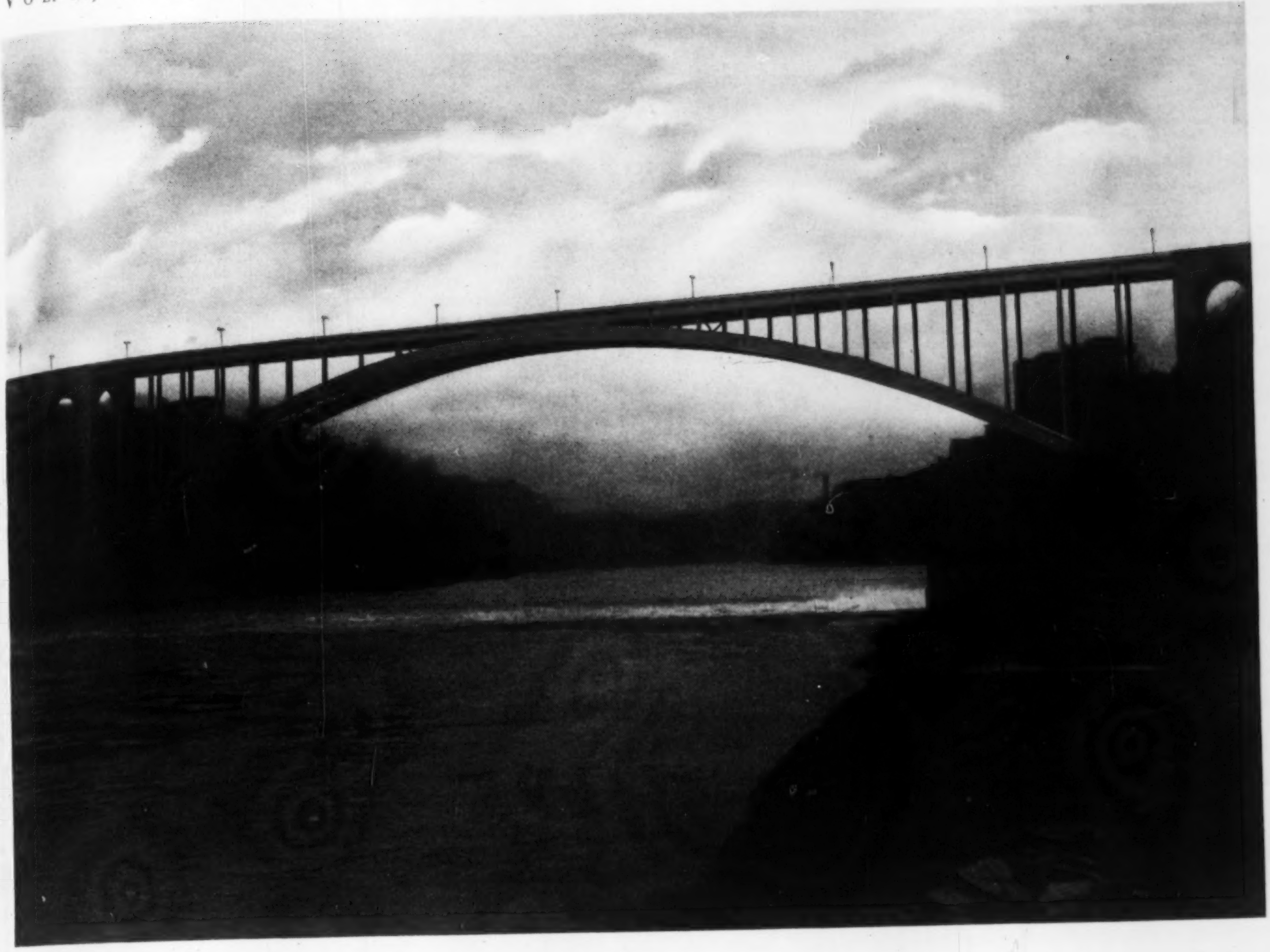
PLANT GROUNDS. Conditioning Plant Grounds, F. Emery. *Southern Power & Industry*, vol. 59, no. 12, Dec. 1941, pp. 83–84. Article explains manner in which unfit land may be reclaimed to provide additional area for storage and other useful purposes.

MATERIALS TESTING

BUILDING MATERIALS, BOMBING EFFECT. Bomb Tests of Materials and Structures, *Eng. News-Rec.*, vol. 128, no. 5, Jan. 29, 1942, pp. 185–187. Data have been made available by War Department as to resistance of various types of construction under actual bombing; this information, which is considered of special value in providing civilian air-raid protection, is based upon extensive tests with several different types of bombs of various sizes.

CONCRETE. Experiments on Plain and Reinforced Concrete in Torsion, W. T. Marshall and N. R. Tembe. *Structural Engr.*, vol. 19, no. 11, Nov. 1941, pp. 177–191. Report of tests on strength of plain and reinforced concrete in torsion; tests on plain concrete show that concrete does not behave as elastic material but as one with both elastic and plastic properties; torsional rigidity of reinforced rectangular specimen is same as that for plain specimen of same dimensions. Bibliography. Before Instn. Structural Engrs.

LABORATORIES. Los Angeles Harbor Department Testing Laboratory, C. M. Wakeman. *Am. Soc. Testing Matls.—Bul.*, no. 114, Jan. 1942, pp. 28–30. Article describes development of testing laboratory established by Board of Harbor Commissioners, and illustrates some phases of important work undertaken, which includes "waterproofing" of concrete for marine use, testing of paving for transit sheds and wharves, paint



Another link between two United Nations

On Decoration Day, the Rainbow Bridge at Niagara Falls will be formally dedicated and opened to traffic between the United States and Canada.

The 950-foot arch of the Rainbow Bridge is the longest arch of its type ever built. The bridge itself is the second Bethlehem-built link between the two nations in this area. Thirty miles upstream, the Peace Bridge, also built by Bethlehem's fabricated steel construction division, spans the Niagara River between Buffalo and Fort Erie.

The roster of Bethlehem-built bridges is a long one. It includes among many others the Golden Gate Bridge, the George Washington Bridge, and the Ambassador Bridge at Detroit, the latter another span connecting the Dominion of Canada with the United States.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

studies, testing of wood preservatives, and testing of fish cannery wastes.

Soils. Analysis of Soil Bearing Test, S. M. May. *Roads & Streets*, vol. 84, no. 11, Nov. 1941, pp. 34–35. Description of method used in conducting tests to determine safe allowable soil load involved in design of soil bearing foundations for highway bridge construction; analyses of test data discussed.

MUNICIPAL ENGINEERING

Public Works. Action on Municipal Front, E. J. Cleary. *Eng. News-Rec.*, vol. 128, no. 3, Jan. 15, 1942, pp. 94–96. Problems confronting public works activities of average municipality due to mass population migration to national defense manufacturing centers; water supply development, sewage disposal progress, and refuse disposal activities discussed.

ROADS AND STREETS

Airport Runways. Special Runway for World's Largest Plane, R. D. Spencer *Pub. Works*, vol. 73, no. 1, Jan. 1942, pp. 19–20. Illustrated description of concrete runway at Clover Field, Santa Monica, Calif., which is 200 ft wide and 3,870 ft long, constructed in twelve $^1/_2$-ft strips of 9-6-9 in. cross section, with each strip thickened at edge; adjacent slabs were keyed together by tongue-and-groove made by bolting 1-in. wooden strip to steel forms.

Airports, Boise, Idaho. Construction Coordination at Boise Air Base, R. Laing. *Pac. Bldr. & Engr.*, vol. 47, no. 12, Dec. 1941, pp. 32–35. Illustrated description of construction methods and equipment employed; notes on cantonment; drainage; asphalt paving; and concreting operations.

Bituminous. Bituminous Treatment of Sandy Soil Roads in Nebraska, P. F. Critz and C. M. Duff. *Pub. Roads*, vol. 22, no. 10, Dec. 1941, pp. 215–230. Extensive review of investigations carried out to determine type of surface material best suited to needs; bituminous mixed-in-place treatment considered; experimental roads constructed using slow curing and medium curing asphaltic materials; experiment provided information on possible methods of improving sandy soil roads and also on manner in which construction should be carried out.

Construction. Asphalt Paving by Night Aids City Traffic. *Am. City*, vol. 56, no. 12, Dec. 1941, pp. 58–59 and 81. Notes on methods employed at Rochester, N. Y., in intensive program to repave business district.

Design. Design and Control of Flexible Pavement Construction, W. H. Campen and J. R. Smith. *Roads & Streets*, vol. 84, no. 12, Dec. 1941, pp. 39–41. Report on laboratory and field research work on design and control of flexible pavement construction for streets, roads, and airport runways; stability and strength tests and trends which they indicate are discussed.

Highway Engineering, Research. Recent Developments in Road Research. *Commonwealth Engr.*, vol. 20, no. 4, Nov. 1, 1941, pp. 99–100. Notes abstracted from recent literature as follows: Testing Permeability of Asphaltic Surfaces; Consolidation of Earthworks, K. Keil; Polarized Light; Plant Mix Soil-Cement Base Course over Blown Sand, V. J. Brown; Red Concrete for Slow Traffic; Studies of Subgrade Pressures Under Flexible Road Surfaces, A. T. Goldbeck.

Highway Systems, California. Divided Highways in California, F. Grumm. *Eng. News-Rec.*, vol. 128, no. 5, Jan. 29, 1942, pp. 176–179. Notes on designs of over 200 miles of divided highways in California; eight types of median strips are in use, each being designed to meet some special condition or as improvement on earlier type; state has freeway law that checks encroachments on capacity of divided highways.

Highway Systems, Canada. From Niagara Falls to Fort Erie Now Open to Traffic, J. M. Breen. *Eng. & Contract. Rec.*, vol. 54, no. 51, Dec. 17, 1941, pp. 12–14. General comprehensive article discusses outstanding features of new highway; review of construction methods, lighting, grade-separation structures, and drainage methods.

Highway Systems, Pennsylvania. Winter Maintenance on Pennsylvania Turnpike, H. F. Webber. *Roads & Streets*, vol. 84, no. 11, Nov. 1941, pp. 31–33. Details of organization and equipment available for snow removal and cindering purposes.

Maintenance. Conservacion de Caminos, G. del Arenal and J. F. Rodriguez Cabo. *Ingenieria* (Mexico), vol. 15, no. 11, Nov. 1941, pp. 342–345. Road conservation; its importance; works involved; receipt of roads for conservation; specifications to which first-class roads should be subject. Before Fourth Pan-American Highway Congress.

Maintenance and Repair. Specification for Asphalt Surface Treatment or Retreatment of Old Bituminous Surfaces. *Roads & Road Constr.*, vol. 19, no. 228, Dec. 1941, pp. 201–202. Treatment is intended for application to old bituminous pavements including mixed types and bituminous macadam and to the renewal or maintenance of original surface treatments as required; specifications for materials and construction.

National Defense. Indispensable Quality of Highways to National Defense, T. H. MacDonald. *Crushed Stone J.*, vol. 14, no. 5, Sept.-Oct. 1941, pp. 12–18. Consideration of current demands on highway transport and of procedures established to deal with problems.

Subsoils. Design Foundation Courses for Highway Pavements and Surfaces, F. J. Grumm. *Calif. Highways & Pub. Works*, vol. 19, no. 11, Nov. 1941, pp. 4–6, 15, and 18. Discussion of adequate subgrades for highways; basic problem presented and some of methods of solution; preliminary study of soils and materials necessary; expansion tests of foundation material; destructive effect of repetitive wheel loadings; pavement types required.

Subsoils. Los Suelos en la Ingenieria de Caminos, J. Martinez Elissague. *Ingenieria* (Mexico), vol. 15, no. 8, Aug. 1, 1941, pp. 233–241. Soils in highway engineering; definitions of soil; engineering concept includes any type of unconsolidated rock material; components; physical characteristics; granular composition; limits of consistency and factors of contraction; classification of soils; physical properties revealed by classification tests.

Transportation. Looking Ahead in Transportation, V. T. Boughton. *Eng. News-Rec.*, vol. 128, no. 3, Jan. 15, 1942, pp. 88–91. Prospective outlook of transportation development as result of war effort; expansion of air transport; faster road and rail transport; new railroad construction; highway construction, camp access roads; inland waterways; airport construction; and city and intercity transit.

SANITARY ENGINEERING

Mosquito Control. Control del Paludismo Por Obras de Ingenieria Sanitaria, R. Medellin. *Ingenieria* (Mexico), vol. 15, no. 9, Sept. 1941, pp. 281–284. Control of malaria, by sanitary engineering works; only possible means of reducing malaria is by destruction of breeding places of anopheles mosquitoes; discussion of principal methods; data on tests in Tennessee Valley during 1939; enumeration and outline of eight principal steps of sanitary engineering program for control of malaria.

SEWERAGE AND SEWAGE DISPOSAL

Camps, Military. Army Sewage Treatment Plants. *Pub. Works*, vol. 73, no. 1, Jan. 1942, pp. 11–12 and 18. Detailed description of sewage treatment plant at Camp Edwards, Mass., which comprises a Imhoff tank and bio-filter, with sand filters for final treatment; design based on population of 30,000 men and average rate of flow of 3,000,000 gal per day, with maximum rate of 6,000,000 gal per day; there is no river or other body of water in vicinity of camp, so that all sewage must go into ground.

Chlorination. Dosage Control in Sewage Chlorination, G. E. Symons, J. W. Johnson, and R. W. Simpson. *Water Works & Sewerage*, vol. 88, no. 11, Nov. 1941, pp. 519–524. Description of chlorination plant of Buffalo Sewage Treatment Works; pre-chlorination practice; description of control system developed; determination of chlorine demand and dosage; special conditions affecting chlorine control; maintenance of chlorination equipment. Bibliography.

Duluth, Minn. New Sewerage System and Primary Treatment Plant. *Am. City*, vol. 46, nos. 11 and 12, Nov. 1941, pp. 66–68, and Dec., pp. 51–53 and 81. Duluth, Minn., requires fourteen lift stations to pump sewage to main interceptor tunnel and new treatment plant; notes on tunnel, lift stations, screening and grit removal, sludge digestion, sludge disposal building, chemical storage, filter room, study drying, and incineration.

Industrial Waste. Recirculating High Rate Filter in Industrial Waste Treatment, E. F. Eldridge. *Water Works & Sewerage*, vol. 88, no. 11, Nov. 1941, pp. 483–490. Recirculating filter principle applied as secondary treatment process to organic industrial waste; primary treatment outlined; storage or holding tank design; recirculating filter and its operation; importance of ventilation and stone size; recirculating rates and loadings; secondary settling tanks.

Lansing, Mich. Operating Results in Lansing's Combined Garbage-Sewage Disposal. *Pub. Works*, vol. 73, no. 1, Jan. 1942, pp. 24–26. Two and one-half years' operation of plant disposing of all garbage of 75,000 population, combined with its sewage, demonstrates economy and general desirability of process; details of plant which was designed for population of 100,000; sewage flow of 9 mgd average and 18 mgd maximum; garbage, 0.5 lb per capita per day average, 1.0 lb maximum. Before Pub. Works Congress, New Orleans, La.

Sludge. Disposal of Sludge, W. L. Malcolm. *Water & Sewage*, vol. 79, no. 10, Oct. 1941, pp. 28–29, 73–74, and 77. Article treats complete sewage treatment problem in comprehensive outline and defines various steps in process; discussion of relation between velocity and removal of suspended matter; plain sedimentation; chemical precipitation and activated sludge processes described; chart showing sludge formation and treatment given.

Sludge. Sludge Pumping, S. E. Kappe. *Water Works & Sewerage*, vol. 88, no. 11, Nov. 1941, pp. 525–529. Purpose of paper is to discuss briefly problems encountered in moving sewage sludges from one tank to another; paper covers type of pumps used for sludge pumping—their respective advantages and disadvantages—design of sludge lines, and problems involved in sludge pumping and their solution.

STRUCTURAL ENGINEERING

Beams, Concrete. Construction Design Chart—LXXI . . . Maximum Unit Compression in T-Beams, J. R. Griffith. *Western Construction News*, vol. 16, no. 11, Nov. 1941, p. 338. Construction of alinement chart for computing maximum unit compression in T-beams; numerical examples.

Beams, Continuous. Solution of Continuous Beams of Variable Moment of Inertia by Arithmetical Summation, W. A. Ozanne. *Instn. Engrs. Australia—J.*, vol. 13, no. 11, Nov. 1941, pp. 255–261. Paper describes solution of problems involving continuous beams of variable moment of inertia, by means of arithmetical summation method; application of method to actual bridge structure is given.

Concrete Design. Design of Bow Girders in Reinforced Concrete, W. T. Marshall. *Concrete & Constr. Eng.*, vol. 36, no. 12, Dec. 1941, pp. 467–473. Moments, shears, and torques in circular car bow girders; to illustrate method, worked example of bow girder is given.

Roofs, Concrete. Pre-Cast Concrete Roofs. *Concrete & Constr. Eng.*, vol. 36, no. 12, Dec. 1941, pp. 479–481. Standard practice by Native Lands Department of Southern Rhodesia in building houses in native village settlements is illustrated; roof consists of curved ribs at 4-ft centers on which are laid pre-cast slabs 4 ft long, 16 to 21 in. wide, and $1^1/_2$ in. thick.

Welds, Stresses. Study of Stress Distribution in Welded Joints—II, E. W. P. Smith. *Southern Power & Industry*, vol. 59, no. 11, Nov. 1941, pp. 72–74. Further data pertaining to use of rubber models for studying stress; description of method of study of stress distribution based on study of stressed model of suitable material, such as celluloid; application of method; typical models; workmanship is important; brief illustrated description of simple polariscope for use in this work.

TRAFFIC CONTROL

Street Traffic Signs, Plastics. Plastic White Lines for Roads. *Commonwealth Engr.*, vol. 29, no. 5, Dec. 1, 1941, pp. 120–121. Notes on thermoplastic material as applied hot to road surface as thin layer which sets hard on cooling; it hardens rapidly, allowing traffic to pass over it within few minutes of application; composition described is suitable only for open and medium textured road surfaces which provide certain amount of key or mechanical grip; it may be applied to existing road surface without insetting.

TUNNELS

Accident Prevention. Some Essential Safety Factors in Tunneling, D. Harrington and S. H. Ash. *U. S. Bur. Mines—Bul.*, no. 439, 1941, 61 pp., 15 cents. Paper is based partly upon authors' observations and partly upon studies of tunnel driving, covering essentially all types of tunnels in various parts of United States during past 25 years; list gives data on world's longest tunnels; positive and negative value of statistics; tunnel accident experience; cause and prevention of accidents; catastrophes; general observations; suggested regulations concerning toxic gases. Bibliography.

Construction, Concrete Lining. Transit Mixers Used Effectively on Contra Costa Canal, O. G. Boden. *Am. Concrete Inst.—J.*, vol. 13, no. 3, Jan. 1942, pp. 269–272. Effective use of transit mixers on 9-mile section of concrete lining considered; five mixers of 4.34-cu yd capacity delivered concrete to canal-lining machine which placed, vibrated, and formed it in position.

Subway Construction, Chicago. Underground Railways at Chicago, U. S. A. *Engineer*, vol. 172, nos. 4476, 4477, and 4478, Oct. 24, 1941, pp. 268–270; Oct. 31, pp. 288–290; and Nov. 7, pp. 317–319. Illustrated description of first 8.75 miles of deep level tunnel system planned to have eventual length of nearly 50 miles; completed section is not yet in operation.

Water Supply, Colorado. Continental Divide Tunnel, U. S. A. *Engineer*, vol. 172, no. 4485, Dec. 26, 1941, pp. 456–457. Illustrated description of tunnel intended to provide for diversion of surplus from headwaters of Colorado River on western slope of Continental Divide to lands on eastern slope in northeastern Colorado.

Water Supply, Grouting. Grouting Tunnel Lining on Aqueduct. *Eng. News-Rec.*, vol. 128, no. 1, Jan. 1, 1942, pp. 19–21. Description of methods used at Delaware Aqueduct in placing grout after tunnel lining is in place; pressure grouting—which includes low pressure operation at pressures up to about 100 lb per sq in. to fill voids around concrete lining—and high pressure

MAN *with* **PENCIL**

Sinks Enemy Battleship!

From 20,000 feet they looked like pencil marks with plumes of smoke. The pilot banked the Flying Fortress and spoke staccato orders into his microphone. The Bombardier braced himself against his bomb sight. A sudden lurch, a sound of rending metal . . . . .

Heroes fighting death in the skies and unsung heroes getting round-shouldered in drafting rooms creating the implements of Victory. Because Craftsmen must have accuracy, uniformity, smoothness and rich tone in their drawing pencils, many specify A. W. Faber's WINNER *Techno*-TONE.

WINNER Techno-TONE guarantees all 4 Freedoms—Freedom from Scratching, Smudging, Flaking and Gritty Hard Spots. Pencil Craftsmen gladly pay the extra few pennies for America's standard of drawing pencil excellence.

BUY A SHARE IN AMERICA

17 scientifically graded tones — 6B to 9H. Polished rich green. Packed in metal box. For sample of your favorite degree, write Dept. CE-5, A. W. FABER, INC., NEWARK, NEW JERSEY.

WINNER *Techno*-**TONE**

DRAWING PENCILS

13c each 2 for 25c $1.25 dozen

At all Drawing and Artists Material dealers and leading Stationers.

THE HOUSE OF A.W. FABER "CASTELL" STANDARD OF THE WORLD

A·W·FABER·*Inc.* NEWARK, N. J.

Companion Pencil — WINNER Thin Colored Checking — Superb colors and strength. Choicest for all prints: 2381 Red; 2382 Blue; 2383 Green; 2385D Yellow; 2437D Orange. 10¢ each. $1.00 dozen. Would you like a sample?

QUALITY

Arkwright
PENCIL CLOTH
WHITE
Prudence
TRACING CLOTH
Arkwright
TRACING CLOTH
Matsurf
PENCIL TRACING CLOTH
FOR PENCIL OR INK
Arkwright
PENCIL TRACING CLOTH

With A 20 Year Record

The twenty years of making quality tracing cloth behind Arkwright is *your* guarantee of quality today!

Twenty years of testing in Arkwright laboratories . . . of insistence on the highest quality raw materials and the highest standards of manufacture have prepared Arkwright for the present emergency. In spite of the vital need for speed and mass production, you can order Arkwright Tracing Cloths today with the same confidence in quality . . . the same assurance of rapid delivery that has made Arkwright the leading American producer of tracing cloth for twenty years. Arkwright Finishing Company, Providence, R. I.

Arkwright
TRACING CLOTHS

grouting at pressures of 600 lb per sq in. have proved better and more economical practice than earlier placing methods.

WATER SUPPLY, NEW YORK. Overcoming Underground Difficulties, F. W. Stiefel. *Gen. Contractors Assn.—Bul.*, vol. 32, no. 12, Dec. 1941, pp. 296–305. Illustrated description of difficulties mastered in driving more than 75,000 lin ft of pressure tunnel in deep rock for Delaware Aqueduct. Indexed in *Engineering Index*, 1941, from *Compressed Air Mag.*, Dec. 1941.

WATER PIPE LINES

CORROSION. Pipe Corrosion Problems in Apartment Buildings, H. L. Shuldener. *Water Works Eng.*, vol. 95, no. 1, Jan. 14, 1942, pp. 32–33 and 48–60. Analysis is made of causes of common water supply problems in buildings due to pipe corrosion; some suggestions concerning removal of rust deposits are presented.

LOSS OF HEAD. Chart for Balancing Pipe Head Losses by Hardy Cross Method, G. M. Slight. *Eng. News-Rec.*, vol. 128, no. 1, Jan. 1, 1942, pp. 41–42. Easily constructed alinement chart that facilitates balancing head losses in pipe networks is described.

WATER RESOURCES

NATIONAL DEFENSE. Water Supply Facilities and National Defense, J. E. Hoover. *Am. Water Works Assn.—J.*, vol. 33, no. 11, Nov. 1941, pp. 1861–1865. General suggestions for protection of industrial facilities with special reference to water supply; vulnerability of water supply facilities; personnel considerations in protection against sabotage; protective lighting, patrol guards, and protective fences.

UNITED STATES. Developments of the Year in Water Supply, R. Nawsom. *Water Works & Sewerage*, vol. 89, no. 1, Jan. 1942, pp. 1–16. Review of progress and trends of 1941; influence of national defense and priorities; defense public works; construction trends; ground-water project at Charlestown, Ind.; prestressed concrete reservoirs and tanks; Colorado River Aqueduct System in operation; new plants and equipment.

WATER TREATMENT

FILTRATION PLANTS, ORILLIA, ONT. Progressive Development of Orillia's Water System, L. G. McNeice. *Eng. & Contract. Rec.*, vol. 54, no. 26, June 25, 1941, pp. 38–41. Description of modern filtration plant installed to effect change from wells to lake supply; details of pumping station, filters, electric power, storage reservoir, and elevated tank

IRON REMOVAL. Iron Removal in Western Pennsylvania, L. S. Morgan and C. H. Young. *Am. Water Works Assn.—J.*, vol. 33, no. 11, Nov. 1941, pp. 1929–1944. Design and operation of plant facilities for iron removal in western Pennsylvania; details and descriptive data on sodium zeolite plants, birm plants, coke contact aeration and sand filtration, manganese zeolite plants; lime treatment and filtration and lime or lime-soda softening.

OZONATION. Ozonation at Whiting, Ind., J. F. Bartuska. *Am. Water Works Assn.—J.*, vol. 33, no. 11, Nov. 1941, pp. 2035–2050. Description of treatment plant using ozone process to purify water taken from Lake Michigan; distribution and control equipment described; control of operation; comparative data on present treatment and former treatment using rapid sand filtration.

POLLUTION. Basic Factors Affecting Pollution of Sub-Surface Water, L. C. MacMurray. *Water Works & Sewerage*, vol. 88, no. 8, Aug. 1941, pp. 360–363. Fundamental physical and biological principles involved in water pollution studies and elementary concepts of ground-water hydrology; biological principles relating to metabolic activity of bacteria; quantitative measure of extent of pollution under certain conditions and effect of pollution under similar conditions.

TASTE AND ODOR CONTROL. Studies on Accuracy of Threshold Odor Values, R. Hulbert and D. Feben. *Am. Water Works Assn.—J.*, vol. 33, no. 11, Nov. 1941, pp. 1945–1958 (discussion), 1958–1964. Description of experiments, results of which show that, contrary to widespread opinion, human sense of smell is totally unreliable as means for estimating odor concentrations quantitatively, with any acceptable degree of accuracy; tests comprised comparative evaluation of four different phenol-value carbons by threshold odor method, using raw waters of various taste and odor types.

WATER ANALYSIS, FLUORIDE DETERMINATION. Modification of Fluoride Determination, R. D. Scott. *Am. Water Works Assn.—J.*, vol. 33, no. 11, Nov. 1941, pp. 2018–2020. Details of author's technique in determination of fluoride content of water supplies which is modification of Sanchi's method; author adds required amounts of hydrochloric acid and sulfuric acid as single solution instead of separately, and adds acid, zirconium salt, and dye as single reagent; outline of procedure given. Bibliography.

WATER WORKS ENGINEERING

CENTRAL VALLEY PROJECT. Central Valley Project in California, W. H. Kirbride. *Western Soc. Engrs.—J.*, vol. 46, no. 3, June 1941, pp. 99–115. Details of water conservation plan to redistribute waters of Sacramento river watershed and San Joaquin river over San Joaquin and Sacramento valleys of central and northern California; primary purpose of project is to furnish water for irrigation, power development, navigation, and flood control; one very important result is increase in water supply of San Joaquin valley for purposes of irrigation.

MEXICO CITY. Seis Siglos de Abastecimiento de Agua en la Ciudad de Mexico, A. Villa Acosta. *Ingenieria* (Mexico), vol. 15, no. 10, Oct. 1941, pp. 298–311. Six centuries of water supply in City of Mexico; historical and descriptive review of sources of supply and distribution systems, from period prior to conquest by Cortes up to modern plant and system, construction of which was begun in 1935.

ONTARIO. Improvements to Scarborough Waterworks System, R. Harrison. *Water & Sewage*, vol. 79, no. 12, Dec. 1941, pp. 11–15 and 42–44. General description of municipality system and notes on recent changes to meet increasing demand for water and ensure more efficient plant operation; details of intake pipe, low-lift pumphouse, low-level pumps, pressure main, drainage, mixing chamber, and filter washing.

TOLEDO, OHIO. Toledo Dedicates Fine New Water Works. *Pub. Works*, vol. 73, no. 1, Jan. 1942, pp. 13–15 and 39–41. New supply from Lake Erie, with present capacity of 80 mgd, comprises intake crib, low- and high-service pumping stations, 3 miles of intake conduit, and 16 miles of pumping and trunk distribution mains; whole costs nearly $10,000,000; intake crib and conduit, low- and high-service pumping stations, and structures at Collins Park area are described.

WAR TIME. Notes on Water Works Defense. D. S. Thomas and H. B. Foote. *Am. Water Works Assn.—J.*, vol. 33, no. 11, Nov. 1941, pp. 1866–1868. Emergency measures suggested to protect distribution system, including duplication of pumping equipment, supply mains, and elevated storage; gate valves should be provided so that no more than 500 ft of main would be affected by any break; sources of emergency supply.

WATER TANKS AND TOWERS, EARTHQUAKE-RESISTANT. What It Takes to Be Earthquake-Resistant. *Eng. News-Rec.*, vol. 127, no. 21, Nov. 20, 1941, p. 742. Design of 500,000-gal elevated tank constructed at Tucson, Ariz., Municipal Airport; earthquake-resistant design of tank required one-third greater amount o steel than tank of conventional design.

HAULING JEEPS ACROSS RAVINES

Another Job for Wickwire Rope

There are many *extra* jobs that wire rope must do today. The Army, the Navy, and the Liberty Fleet need vast quantities of wire rope.

This points up the message: MAKE YOUR WIRE ROPE LAST LONGER.

When wire rope fails too soon, it wastes badly needed steel, labor and time. If by care you can make *your* wire rope last longer, you are helping to win the war.

When you *do* need wire rope, be sure to get the correct type and size for your service. Our representatives will help you determine the best Wickwire Rope, preformed or Wissco lay, for your use—and after installation will help you get longest life and most economical operation from it.

The reason for the long life of *Wickwire* rope lies in our controlled production, every step of the way from ore pile, to blast furnace, to open hearth, to finished rope.

• • •

Have you a copy of the book "Know Your Ropes"? It will help *you* get longer rope life. More than 25,000 wire rope users all over the world regard it as the authoritative guide to wire rope economy. For your free copy, write Wickwire Spencer Steel Company, 500 Fifth Avenue, New York, N. Y.

WHEN WIRE ROPE LEAVES ITS IMPRINT in sheave or drum groove, there is a filing action on the rope at every start and stop. Grooves having the slightest impressions should be machined and polished. This and forty more rope life-savers are pictured and described in "Know Your Ropes."

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER

WICKWIRE SPENCER STEEL COMPANY

WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

WISSCO PRODUCTS

D/S
FORESTALL SABOTAGE BY NATURE!

WEST DODD PROVIDES SIMPLE AND RELIABLE PROTECTION AGAINST LIGHTNING . . .

Lightning is a powerfully destructive force. And records of the National Board of Fire Underwriters' prove it ranks at the very top as a source of fire. But, if properly controlled, it can be tamed at reasonable cost before there is any chance of stalling men and machines engaged in vital war work.

PROTECTS ORDNANCE PLANTS

West Dodd lightning and static control equipment is being widely installed in Uncle Sam's ordnance plants for this reason. West Dodd is also protecting the power stacks and even factories of many important war industries.

Numerous West Dodd items have been especially designed and built to meet U. S. Government specifications. Approved by American Institute of Electrical Engineers, National Board of Fire Underwriters', and many other authorities. Equipment inspected and labeled at the factory by Underwriters' Laboratories, Inc. Backed by the oldest manufacturer in the field.

West Dodd Systems are IMMEDIATELY AVAILABLE for defense use. Write, wire, or telephone today for further information.

WEST DODD
LIGHTNING CONDUCTOR CORP.

A RELIABLE PROTECTION AGAINST A LEADING CAUSE OF FIRE
D/S
GOSHEN, INDIANA

FREE The West Dodd Engineering Dept. will be glad to assist in planning application, or estimating costs.

Literature Available

AGGREGATE WATERPROOFING—A booklet issued by Kotal Company, 52 Vanderbilt Ave., New York, N.Y., describes the use and advantages of Kotal—a waterproofing agent for aggregates—in bituminous highway construction under all wet or dry weather conditions.

ASPHALT PLANT—"The Fastest Method of Low-Cost Paving" is the name of a new 12-page, 2-color bulletin which outlines the Wood Roadmixer traveling plant method of low-cost, rapid construction of asphaltic mats and stabilized bases. Wood Manufactuting Co., 208 West 8th St., Los Angeles, Calif.

CONSTRUCTION CRANE—A 4-page booklet shows the Tournacrane on numerous applications around factory yards, industrial plants, building construction and earth-moving work, and gives information on lifting capacity and speed. R. G. LeTourneau, Inc., Peoria, Ill.

PUMPS—Complete engineering data on Allis-Chalmers SSUnit pumps and the Electrifugal has just been issued in a 36-page booklet, B6018-B. Head capacity tables and dimension charts make it easy to select proper pumps for individual applications. Performance data and engineering recommendations are also part of the bulletin. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

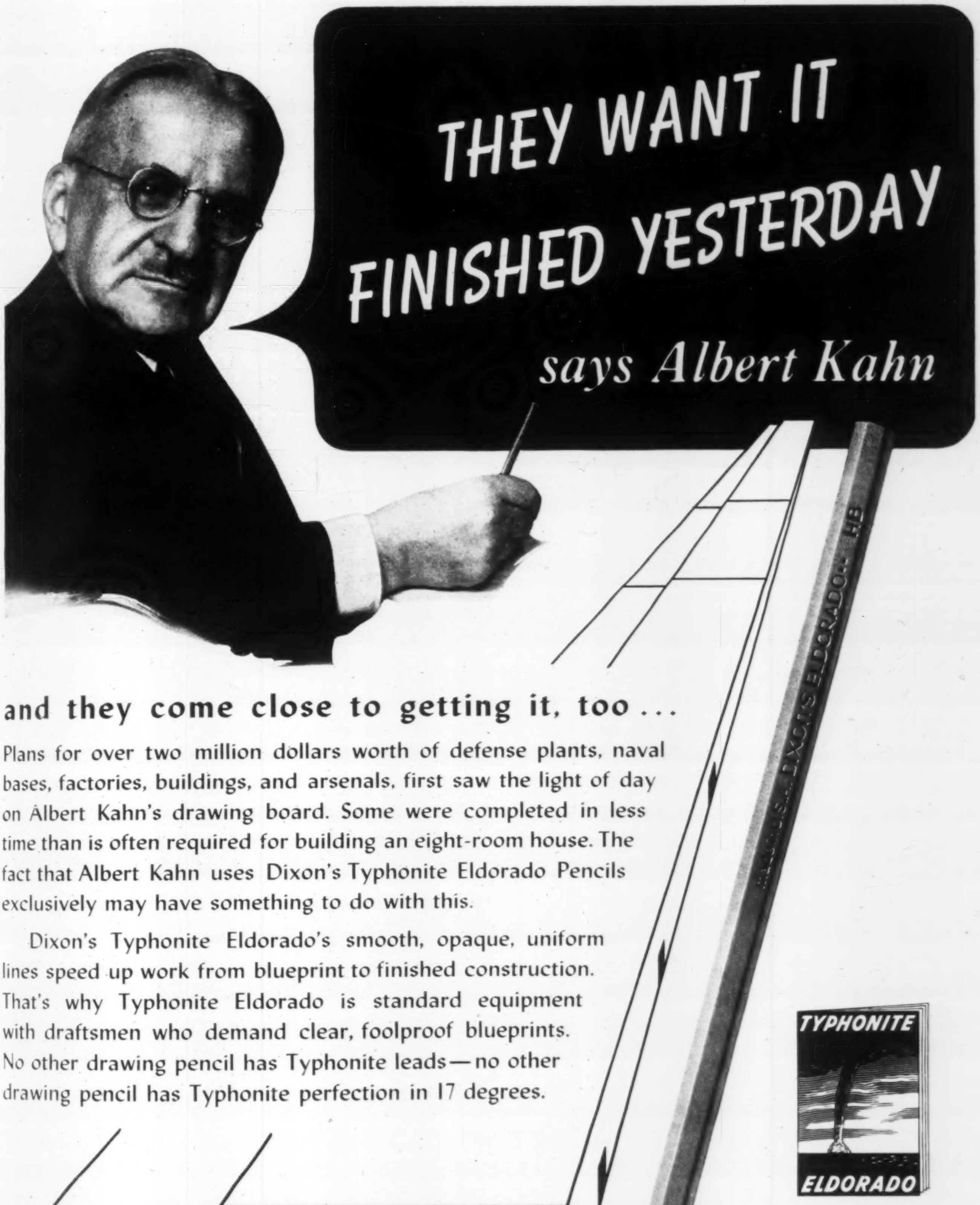
SOIL-CEMENT EQUIPMENT—Entitled, "Allis-Chalmers Equipment for Soil Stabilization," Form No. MS-802 describes the complete line of tools—tractors, graders, discs, harrows, sub-graders, mixers, water distributors, and rollers—to handle this type of paving construction. Allis-Chalmers, Milwaukee, Wis.

SPEED CHANGERS—A new Bulletin, B6013A, on the Vari-Pitch Speed Changer, issued by the Allis-Chalmers Mfg. Co., Milwaukee, Wis., contains diagrams, operating data, and selection tables on Speed Changer units in sizes ranging from $1^1/_2$ to 75 hp, giving speed variations in a range of 375%.

SPRINKLING FILTERS—The P.F.T. Sprinkling Filter Data Book No. 130, just published, covers the application in sewage treatment of sprinkling filters of Separate Nozzle Field and Common Nozzle Field design, and carries many other charts and tables of value to consulting and sewage plant engineers. Pacific Flush Tank Co., 4241 Ravenswood Ave., Chicago, Ill.

TRAFFIC CROSSING—A 4-page booklet describes the Tournapass, a portable, low-cost overpass, designed to eliminate traffic congestion at busy intersections. Photographs, actual time studies and car counts taken at a recent demonstration and trial period are featured. R. G. LeTourneau, Inc., Peoria, Ill.

TRUCK CRANE—A new 6-page illustrated Book No. 1928, on Model HC-70 truck-mounted crane, gives brief specifications, clearance dimensions, and lifting capacities, including capacities with 30, 40 or 50 ft long boom, with or without the use of outriggers. Link-Belt Speeder Corp., 301 West Pershing Road, Chicago, Ill.



and they come close to getting it, too ...

Plans for over two million dollars worth of defense plants, naval bases, factories, buildings, and arsenals, first saw the light of day on Albert Kahn's drawing board. Some were completed in less time than is often required for building an eight-room house. The fact that Albert Kahn uses Dixon's Typhonite Eldorado Pencils exclusively may have something to do with this.

Dixon's Typhonite Eldorado's smooth, opaque, uniform lines speed up work from blueprint to finished construction. That's why Typhonite Eldorado is standard equipment with draftsmen who demand clear, foolproof blueprints. No other drawing pencil has Typhonite leads—no other drawing pencil has Typhonite perfection in 17 degrees.

This interesting, informative booklet, a little history of pencil making, is yours for the asking. Please write on your business or professional stationery.

PENCIL SALES DEPARTMENT 38-J5 · JOSEPH DIXON CRUCIBLE CO. · JERSEY CITY, N. J.

As In '17—

IT'S LAYNE WATER SYSTEMS FOR THE ARMY, NAVY & WAR NEEDS

Built under extreme emergency and with amazing speed, thousands of Layne Wells and Pumps are providing billions of gallons of water for war needs—Army Camps, Flying Fields, Naval Stations, Ordnance Works, Chemical Plants, Munition Plants and numerous fortified outposts. Though built with utmost speed, those Layne Water Systems have the strength and ruggedness which will last for years and years.

Layne Well Water Systems, regardless of when, where or how speedily built, are the finest that can be constructed. They will faithfully fulfill their mission until victory comes, whether this year, next year or years from now.

Those men of the Army, Navy and Marine Corps who some day will return to civilian life may well remember that it was Layne who built the well water systems which helped to win the war.

In the meantime, essential civilian water supply service continues. The Layne organization is fulfilling its pledge of "Keep Them Flowing!"

LAYNE & BOWLER, INC.
Memphis, Tenn.

LAYNE PUMPS & WELL WATER SYSTEMS

Affiliated Companies

Layne-Arkansas Company	Stuttgart, Ark.
Layne-Atlantic Company	Norfolk, Va.
Layne-Central Co.	Memphis, Tenn.
Layne-Northern Company	Mishawaka, Ind.
Layne-Louisiana Company	Lake Charles, La.
Layne-New York Co.	New York City.
Layne-Northwest Company	Milwaukee, Wis.
Layne-Ohio Company	Columbus, Ohio
Layne-Texas Company	Houston, Texas.
Layne-Western Company	Kansas City, Mo.
Layne-Western Co. of Minn.	Minneapolis, Minn.
Layne-Bowler New England Corp.	Boston, Mass.
International Water Supply, Ltd.	London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

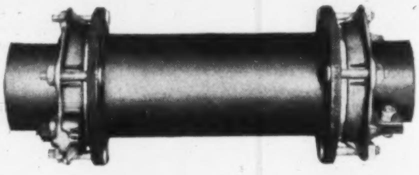
Equipment, Materials, and Methods

New Developments of Interest, as Reported by Manufacturers

Bomb Damage Repair Clamp

GAS AND WATER COMPANIES in danger areas will be interested in a new device for quickly repairing mains which have been badly damaged by bomb explosions. The new clamp, known as the Skinner-Seal Bomb Crater Clamp, makes a tight, lasting connection between the ends of the broken main and a length of steel pipe cut to fill the space.

Developed by the M. B. Skinner Company, South Bend, Ind., the new adapter makes use of standard Skinner-Seal Bell Joint Clamp parts to splice a proper length of steel pipe to the broken main. Illustration shows how connection is made between main and steel pipe; left end makes connection with main; right end with steel pipe; and the flanges, welded to center tube, act as anchor rings for bolts.



Faster Rock Drill

THE D-505 DRIFTER, the latest addition to the Ingersoll-Rand line of rock drills, is reported to be the fastest and most durable drifter ever produced by the company. Exhaustive tests have shown that the efficiency of the D-505, based on inches drilled per cu ft of air at 90 lbs pressure, is 34% greater than that of their previous 4 in. bore machines, and 52% greater at 70 lbs pressure.

Many features contribute to the ruggedness of the D-505. For example, the wall section of the fronthead is 10% thicker than that of the previous 4 in. drifters, the shank aligner is 18% longer and 8% thicker, and an improved chuck design of heavier construction has been included. The design of the piston-stem cushion bearing permits a heavier metal section in the cylinder and a port on each side of the cylinder balances the piston within the cylinder. For more detailed information request Form 2786 from Ingersoll-Rand Co., 11 Broadway, New York, N.Y.

Four New Form Devices

FOUR ADDITIONS to their line of concrete form-tying devices and accessories are announced by Richmond Screw Anchor Co., Inc., 836 Liberty Ave., Brooklyn, N.Y.

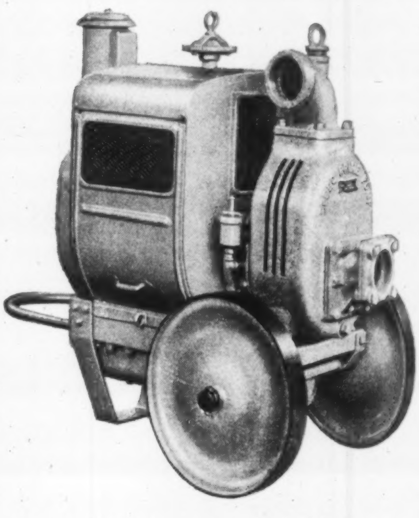
One of these is a base plate adjusting clamp, positive and accurate in work, removable when grout sets, and capable of being reused time after time.

Another is a new type of adjustable screed chair for slabs on fill. This unit is mounted on a swivel and is available for either sound fill or loose fill as required. These are available in three sizes, ranging in chair height from $2^1/_2$ in. to $5^1/_2$ in., and cover a wide range of slab thicknesses. A third new unit is a screed chair similar in many respects to the above type except that it has the additional advantage of an adjustable head mounted on a swivel.

The fourth item is an adjustable malleable iron column clamp, which can be used with lumber or steel forms with or without stiffeners. The two-piece clamp is adjustable for columns 8 in. square to 12 in. square including lumber, and weighs only four lbs each. Complete data sheets are available on these four new form-tying devices.

New Model Four Inch Pump

CHAIN BELT COMPANY announces a new model 4 in. pump with a capacity of 30,000 gal per hr. This pump is powered by a 10–12 hp air-cooled engine and has a simple design for dependable low-cost service. It is self-priming and has the patented Rex Z-Metal air peeler which peels the air from the impeller when the pump is priming or when it is actually pumping. This pump also has a Rex Z-Metal impeller and alloy steel volute liners to defeat wear. Detailed information and literature from Chain Belt Company, 1600 West Bruce St., Milwaukee, Wis.



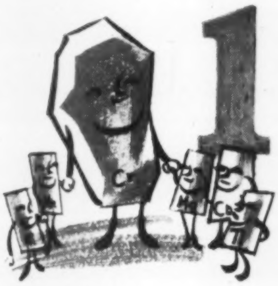
New Concrete Spreader

BLAW-KNOX COMPANY, Blawnox, Penna., announces a new model Transverse Blade Concrete Spreader for airport and road building, with width adjustments up to five feet. By means of the adjustment, a 10 ft spreader will extend to a maximum width of 15 ft and a 20 ft to a maximum width of 25 ft. Bulletin No. 1851 shows the method of operation of this new spreader, in a step-by-step series of photographs and sketches. Also illustrated is the Blaw-Knox vibrator.

Basic Facts about

STAINLESS STEELS

A STAINLESS STEEL PRIMER



STAINLESS STEELS

are corrosion-resistant steels containing at least 12 per cent chromium with or without other alloying elements, such as nickel, manganese, molybdenum, columbium or titanium. They are supplied in a wide range of analyses.

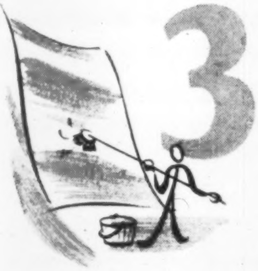
The stainless steels vary in corrosion resistance, workability, wear resistance, and physical properties according to the amount of chromium, carbon and other modifying elements present.

CORROSION
OXIDATION

VALUABLE PROPERTIES INCLUDE:

Good corrosion and oxidation resistance . . . varying almost in direct proportion to the amount of chromium present.

High strength-weight ratio in some cold-rolled types permitting fabrication of strong, light-weight trains, aircraft, and other structures.

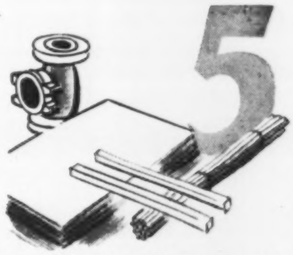


MAINTENANCE

of stainless steels is simple. Washing with soap, household cleanser, and water will keep the surface bright and free from surface deposits.

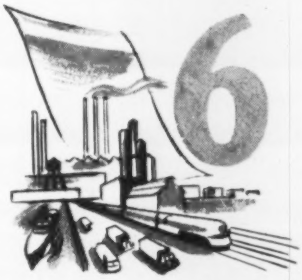
FABRICATION

is accomplished by almost all common methods. They can be machined, spun, deep-drawn, forged, punched, stamped, and otherwise mechanically-worked. They can be welded by all the common welding methods. If the austenitic steels are stabilized with columbium or titanium, and columbium-bearing welding rod is used, no annealing is necessary after welding.



MANY FORMS

are available in the common analyses including sheet, plate, strip, tubing — both seamless and welded — bars, wire, cable, welding rod, and a variety of cold-rolled shapes. Stainless steel is also supplied as foundry castings.



APPLICATIONS

of stainless steel are numerous. Because of their resistance to corrosion and oxidation, as well as their high strength and bright surface, stainless steels have been used in hospitals, chemical plants, oil refineries, railroad trains, aviation equipment, and power plants. In the present emergency, they are available only for those industries participating in war production.

• • •

Although we do not make steel, we have for more than 35 years produced "Electromet" ferro-alloys and metals used in making steel. With the knowledge accumulated from this experience, we are in a position to give impartial advice. If you have a specific problem concerning the manufacture, fabrication, or use of stainless or other alloy steels, consult us without obligation.

Electromet
Trade Mark
Ferro-Alloys & Metals

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York, N. Y.
In Canada, Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

FOUNDATIONS
PRETEST UNDERPINNING
TUBA STEEL CYLINDERS
MASS CONCRETE CONSTRUCTION

SPENCER, WHITE & PRENTIS, INC.
NEW YORK, N. Y.

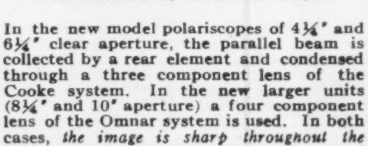
"COMMERCIAL"
METHODS

of tunneling—described in our booklet—every engineer interested in tunnel design should have it—Drop us a card.

COMMERCIAL
TUNNEL LINERS

THE COMMERCIAL SHEARING AND STAMPING CO.
YOUNGSTOWN, OHIO

Polaroid*... Photoelastic Polariscope for Stress Determination



To the machine designer, photoelastic stress analysis is not only of value in the verification of calculations based on theoretical solutions, but also in the solution of problems where theoretical analysis is not available. Where weight and space must be conserved actual stress distribution is more important than stress indicated by theoretical analysis.

In the new model polariscopes of 4¼" and 6¼" clear aperture, the parallel beam is collected by a rear element and condensed through a three component lens of the Cooke system. In the new larger units (8¼" and 10" aperture) a four component lens of the Omnar system is used. In both cases, *the image is sharp throughout the field, free of aberration, astigmatism and distortion.*

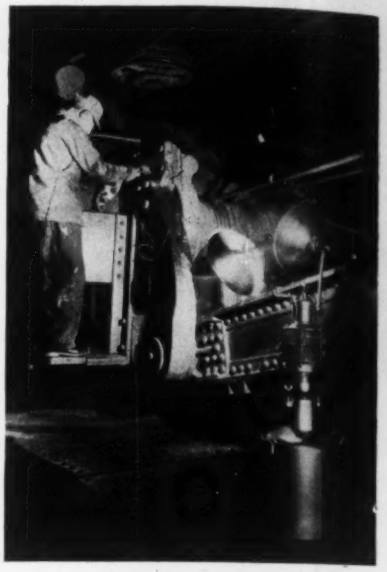
Literature of new model polariscope now available

POLARIZING INSTRUMENT CO.
630 Fifth Ave., New York, N. Y.

**T. M. Reg. U.S. Pat. Off. by Polaroid Corporation*

New Carbide Floodlights

NATIONAL CARBIDE CORPORATION announces its new line of portable floodlights as a dependable source of adequate lighting for construction and repair work, for routine railroad checking jobs, or for emergency use.



The new NC-200 model (illustrated), which is the largest unit now being made, has two 8,000 cp floodlights constructed on swing joints, thereby allowing independent directional control with 16,000 cp concentration of light. This portable floodlight may be used continuously or intermittently, and is always ready for instant use until the carbide charge is exhausted. Additional information, literature, and prices may be obtained from National Carbide Corporation, 60 East 42nd St., New York, N.Y.

Pipe Line Fittings for Emergency Repairs

ALL CLASSES OF DAMAGE to mains are said to be speedily repaired with the fittings announced by James B. Clow & Sons, Chicago, Ill. The types of fittings are few in number—adapter sleeves, mechanical joint pipe, mechanical point split sleeve, pipe bell plugs, and pipe caps.

With these fittings, in sizes to match the piping in the city's distribution system, it is claimed that all damage—short breaks or those breaks involving two or more full lengths of pipe—may be repaired without leading or calking. The fittings are designed for installation under all conditions, under water if necessary, with only a wrench needed to make up the joints. A recent folder describes, illustrates, and lists the sizes of these fittings.

RUBBER PRODUCTS—The last two of the series of six pamphlets on the subject of "How to Get the Most Service Out of Industrial Rubber Products" has been published by The B. F. Goodrich Company, Akron, Ohio. Titles of these pamphlets are, No. 5, "Rubber Hose," and No. 6, "Mats and Matting."

SALVAGED FOR RE-USE in new ocation after 50 years' service

CAST IRON MAINS, when abandoned or re-routed, can be salvaged and re-used, thus saving money for the taxpayer. For example, the 16-inch cast iron pipe shown above had served the City of Roanoke, Virginia, for 50 years in its original location. Last year it was removed to make way for a new armory and relaid in a new location to serve out its full life of more than a century.

We have on file many records of old cast iron mains which have been taken up and re-used, or sold to other cities for re-use, or sold as scrap. It is impossible to foretell future requirements or population shifts in metropolitan cities but any public official can be sure that, when water or sewer mains must be abandoned or re-routed, the pipe can be salvaged or re-used, if it is cast iron pipe.

Pipe bearing this mark is cast iron pipe

TRADE MARK REG.

Available in diameters from 1¼ to 84 inches.

CAST IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1015 PEOPLES GAS BUILDING, CHICAGO, ILLINOIS

CAST IRON PIPE

PUBLIC TAX SAVER NO. 1

DOUGLAS, DONALD, Los Angeles, Calif. (Age 37) (Claims RCA 1.5 RCM 5.8) Sept. 1939 to date with Murray Erick, Structural Engr., in responsible charge of designing and drafting on various types of factories, commercial and industrial buildings, etc., previously with Walt Disney Enterprises, Witner & Watson, Archts., and J. C. Austin, Archt.

GAUNTT, JAMES GILLIS, Chattanooga, Tenn. (Age 56) (Claims RCA 5.2 RCM 26.7) July 1941 to date Gen. Mgr., Mark K. Wilson Co., Bldrs.; previously Supervisor, TVA, Knoxville, Tenn.

GIBBS, MAXWELL, Honolulu, Hawaii. (Age 49) (Claims RCA 5.0 RCM 18.0) 1925 to date in private practice as member of firm, Gibbs-Rice Co., (1925 to 1929) and Maxwell Gibbs Corporation (1929 to 1932), New York City, Engrs. and Contrs., and since 1933 Cons. Prof. Engr. and Cost Accountant.

GILLESPIE, JOHN SANBORN, Huntington, W.Va. (Age 39) (Claims RCM 6.7) May 1941 to date Dist. Engr., Dist. 2, West Virginia State Road Comm.; previously City Engr., Huntington, W.Va.

GREENE, RONALD, Asheville, N.C. (Age 51) (Claims RCM 26.7) Feb. 1921 to date Archt., including periods of partnership with other architects and engineers, at present as member of firm, Greene & Freeman, Archts. & Engrs., Asheville and High Point, N.C.

HALE, ROBERT SHEPARD, Rock Island, Ill. (Age 36) (Claims RCM 15.5) Aug. 1941 to date Chf. Engr., Office of Area Engr., Rock Island (Ill.) Arsenal; previously Cons. Engr., Chicago; Constr. Engr., Public Bldgs. Branch, Procurement Div., U.S. Treasury Dept.

HENDERSON, GEORGE LOGAN (Assoc. M.), Bakersfield, Calif. (Age 50) (Claims RCA 7.6 RCM 14.5) Nov. 1928 to Nov. 1930 Asst. to Chf. Engr., and Nov. 1930 to date Chf. Engr., and since Aug. 1933 also Asst. to Gen. Mgr., Kern County Land Co. and Kern County Canal & Water Co., and affiliated companies.

HYLAND, RONALD TAIT, Long Beach, Calif. (Age 55) (Claims RCA 1.0 RCM 27.5) 1941 to date Chf. Cost Control Engr., Atkinson-Pollock Co., Contrs.; previously Asst. Subway Engr., City of Chicago, Ill.; Asst. Engr., Great Lakes Dredge & Dock; Chf. Engr., Williams Bros. Corporation.

JENKINS, ARTHUR CLYDE, Berkeley, Calif. (Age 40) (Claims RCA 4.2 RCM 6.1) July 1931 to date with Eng. Dept., California R.R. Comm., in various capacities, since March 1940 Transportation Research Engr. and Examiner.

JOHNSON, ELMER GEORGE (Assoc. M.), Springville, Utah. (Age 38) (Claims RCA 3.6 RCM 5.3) Dec. 1940 to date with Bates & Rogers Constr. Corporation, as Asst. Gen. Supt., Asst. Chf. Engr., and (since March 1942) Chf. Engr.; previously with M. Pontarelli Constr. Co. as Chf. Engr.; Res. Engr. Inspector, PWA; Inspector, City of Detroit.

KEALY, PHILIP JOSEPH, Chicago, Ill. (Age 57) (Claims RCM 34.4) April 1934 to Feb. 1942 City Member, and Feb. 1942 to date Chairman, Board of Superv. Engrs., Chicago Traction.

KERR, HORACE SCOTT, San Antonio, Tex. (Age 43) (Claims RCA 3.9 RCM 14.8) May 1924 to date with Texas State Highway Dept., as Asst. Res. Engr., Res. Engr., Asst. Div. Engr., and (since June 1935) Senior Res. Engr.

KING, HENRY ROYAL, Evanston, Ill. (Age 44) (Claims RCA 2.8 RCM 17.4) June 1923 to date with San. Dist. of Chicago, Ill., as Jun. Engr., Asst. Civ. Engr., and (since Jan. 1935) Senior Civ. Engr.

KNOOP, WERNER CALDWELL, Little Rock, Ark. (Age 40) (Claims RCA 4.3 RCM 13.7) Jan. 1931 to date member of firms, Capital Steel Co., and Anderson & Knoop.

MCGUIRE, ORLA EUGENE, Morehead City, N.C. (Age 38) (Claims RCA 3.0 RCM 5.8) Sept. 1941 to date Designing Engr., Olsen, Deitrick, Carr & J. E. Greiner Co., Marine Air Base, Cherry Point, N.C.; previously Asst. Engr., Bureau of Eng., Michigan Dept. of Health, Lansing, Mich.

MAIA PENIDO, JOAO AUGUSTO, Rio de Janeiro, Brazil (temporary address New York City) (Age 35) (Claims RCA 3.0 RCM 5.0) Aug. 1941 to date Office Engr., Brazilian Div., A.D.P. Pan American Airways, Inc.; previously with Municipality of Rio de Janeiro, Brazil, in various capacities.

MASTRIANI, SAMUEL GABRIEL (Assoc. M.), Dunmore, Pa. (Age 38) (Claims RCA 11.0 RCM 6.5) June 1930 to date Engr., Borough of Dunmore, Pa.

MATHIAS, JARED LEROY (Assoc. M.), San Francisco, Calif. (Age 56) (Claims RCA 14.1 RCM 12.5) July 1918 to date with U.S. Bureau of Public Roads and U.S. PRA as Associate Highway Engr., Highway Engr., Senior Highway Engr. and (since June 1941) Dist. Planning Engr.

MATTHEWS, JAMES FREDERICK (Assoc. M.), Brooklyn, N.Y. (Age 49) (Claims RCA 12.9 RCM 6.1) Nov. 1924 to date Cons. Engr. and Appraiser on land valuation, water front, piers, buildings, machinery, etc.

MILLNER, HARRY LEWIS, Morganton, N.C. (Age 73) (Claims RCA 1.0 RCM 30.0) May 1928 to date on examinations, reports and appraisals for investment bankers, etc.; Jan. 1914 to May 1928 Chf. Engr., Catawba Valley Light & Power Co. plant.

MOEHLE, FREDERICK LOUIS WILLIAM (Assoc. M.), Baltimore, Md. (Age 38) (Claims RCA 7.2 RCM 8.8) Dec. 1931 to date Cons. Engr. and Archt.

PARKMAN, GEORGE HENRY ALGERNON, JR., Pittsburgh, Pa. (Age 34) (Claims RCM 11.1) Aug. 1938 to date Constr. Engr. and Director of building construction and maintenance, Westinghouse Elec. & Mfg. Co.; previously Pres., Parkman Constr. Co.

POLK, MARTIN COLLINS, Chico, Calif. (Age 69) (Claims RCA 9.5 RCM 15.0) 1935 to date Assessor, Butte County; also, since 1940 member of Reclamation Board of California, and private consulting practice.

ROBINSON, WALTER LEONARD, College Park, Ga. (Age 39) (Claims RCM 14.9) Sept. 1937 to date Gen. Mgr., W. L. Florence Constr. Co., Gen. Contr., Powder Springs, Ga.; previously Service Engr., Lone Star Cement Corporation, Birmingham, Ala.

RUDERMAN, JAMES, Richmond Hill, N.Y. (Age 43) (Claims RCA 2.3 RCM 13.7) Oct. 1928 to date Cons. Structural Engr., New York City.

SCHMIDT, LEWIS ADELBERT, JR. (Assoc. M.), Guild, Tenn. (Age 41) (Claims RCA 7.5 RCM 6.3) Feb. 1936 to Feb. 1941 Constr. Plant Designing Engr., and Feb. 1941 to date Acting Constr. Engr., Hales Bar Dam, TVA.

SLOCUM, ROY HARLEY, Fargo, N.Dak. (Age 65) (Claims RCM 34.6) Sept. 1907 to date Prof. of Civ. Eng., and Head of Dept., North Dakota Agricultural Coll.

STACY, SHERWOOD, JOHN, Diablo Heights, Canal Zone. (Age 38) (Claims RCA 3.0 RCM 9.4) Aug. 1940 to date Associate Engr., The Panama Canal, 3d Locks, S.E.D.; previously with Wyoming State Highway Dept., as Rodman, Instrumentman, Asst. Materials Engr., Materials Engr., and Soils Engr.

TILLEY, BERNARD WHITE, Morton, Ill. (Age 41) (Claims RCA 12.0 RCM 5.3) April 1924 to Jan. 1937 Jun. Highway Engr., and Jan. 1937 to date Asst. Highway Engr., Illinois Div. of Highways, since June 1941 with Bureau of Design, Bridge Office, Springfield, Ill.

TRUE, CLARENCE HARVEY, Balboa Heights, Canal Zone. (Age 49) (Claims RCA 1.0 RCM 12.4) July 1931 to date with The Panama Canal as Draftsman, Reinforced Concrete and Structural Steel Designer, and (at present) Associate Engr.

WARDWELL, FRANK CARLTON (Assoc. M.), Joliet, Ill. (Age 54) (Claims RCA 9.9 RCM 15.6) Oct. 1941 to date Res. Engr., and later Project Mgr., Kanakee Ordnance Works; previously with TVA; with Frederick Snare Corporation, New York City.

WATSON, GEORGE JAY (Assoc. M.), Elmira, N.Y. (Age 53) (Claims RCA 12.2 RCM 7.6) June 1910 to date (except short intervals) with American Bridge Co. as Draftsman, Checker, Squad Leader, Dept. Engr., Acting Plant Engr., and (since Oct. 1939) Plant Engr.

WINTER, HUGO HERMAN (Assoc. M.), South Pasadena, Calif. (Age 46) (Claims RCA 5.8 RCM 15.1) Sept. 1917 to date with City of Los Angeles, Calif., in various capacities, since Sept. 1937 Rapid Transit Design Engr., Bureau of Eng.

WINTERBERG, SAMUEL JAY, New York City. (Age 38) (Claims RCA 4.2 RCM 11.8) June 1936 to date Chf. Engr., Fehlhaber Pile Co., Inc.

APPLYING FOR ASSOCIATE MEMBER

ADAMS, WILLIAM DOUGLAS, Pedro Miguel, Canal Zone. (Age 30) (Claims RCA 1.4) Feb. 1941 to date Asst. Engr., Municipal Eng. Div., The Panama Canal; previously Topographical Draftsman, New Jersey State Highway Dept., Newark, N.J.; with Elmer Blackwell, Tenafly, N.J., and R. W. Hebard & Co., New York City, etc.

ANDERSON, ALLEN JAMES, Bismarck, N.Dak. (Age 33) (Claims RCA 3.3) April 1934 to date with North Dakota Highway Comm. as Road Draftsman, Structural Draftsman, Res. Engr., Structural Designer, and (since March 1940) Structural Designer and Structural Engr., Bridge Dept.

ARENA, JOSEPH RICHARD, Jacksonville, Fla. (Age 33) (Claims RCA 11.3) Feb. 1942 to date Associate Structural Engr., U.S. Engrs.; previously Civ. Engr., Dept. of Bridges and Bldgs., St. Louis, Mo.

BAFFA, JOHN JOSEPH (Junior), Brooklyn, N.Y. (Age 28) (Claims RCA 2.9) June 1938 to date Asst. Engr. to Elson T. Killam, Hydr. and San. Engr., New York City; previously Res. Engr., The American Centrifugal Corporation; Asst. Engr. with Alexander Potter, Cons. Engr., New York City.

BARON, FRANCIS MARTIN, New Haven, Conn. (Age 27) (Claims RC 2.9 D 1.2) July 1939 to date Asst. Prof. of Civ. Eng., Yale Univ.; previously Instructor in Civ. Eng. and student, Harvard Univ.; Asst. Research Engr., Chicago Bridge & Iron Co., etc.

BLICKLE, RAYMOND RENKEN, Fremont, Nebr. (Age 34) (Claims RCA 2.0 RCM 5.5) Jan. 1942 to date Engr.-Designer, Giffels & Vallet, Inc., Nebraska Ordnance Plant; previously Chf. of Party and Field Engr., Giffels & Vallet Inc. and Chas. W. Cole and Son, Archts. and Engrs., Kingsbury Ordnance Plant, LaPorte, Ind.; with Illinois Div. of Highways.

BREWER, MONROE FRANK (Junior), St. Louis, Mo. (Age 32) (Claims RCA 5.2) March 1937 to date with City of St. Louis, Div. of Health, Milk Control Sec., as Dairy Farm Engr., and (since June 1939) Dairy Plant Engr.

BRIGGS, GERALD FRANKLIN, Lincoln, Nebr. (Age 34) (Claims RCA 3.7 RCM 3.4) Aug. 1932 to Nov. 1939 and Feb. 1942 to date with Dept. of Roads and Irrigation, in various capacities, since Feb. 1942 as Engr. on Special Assignment; in the interim Eng. Consultant, successively with Federal Highway Dept. of Argentina, Buenos Aires, and with Brazilian Portland Cement Assoc., São Paulo, Brazil.

CELUCH, JOSEPH JOHN, Woodside, N.Y. (Age 34) (Claims RCA 10.1) Nov. 1921 to date with Vermilya-Brown Co. (formerly Marc Eidlitz & Son, Bldrs.), in various capacities, since Feb. 1942 as Project Mgr.

CLARK, CHARLES WASHINGTON, West Los Angeles, Calif. (Age 49) (Claims RCA 15.4 RCM 2.7) June 1941 to date Eng. Designer, Leeds, Hill, Barnard & Jewett; previously Senior Computer and Surveyor, Holmes and Norver; Senior Surveyor, Dept. of Water and Power, City of Los Angeles, Calif.

CLARK, JAMES GORDON (Junior), Urbana, Ill. (Age 28) (Claims RCA 1.1) Sept. 1936 to June 1941 Instructor, and June 1941 to date Associate, in Civ. Eng., Univ. of Illinois.

CLINKSCALES, AUSTIN BROWNLEE, JR., Greenville, Miss. (Age 37) (Claims RCA 3.7) Jan. 1940 to date County Engr., Washington County; previously City Engr., Hollandale, Miss.; with WPA, and Washington County Highway Comm.

CONTELLO, ANTHONY JOSEPH, Brooklyn, N.Y. (Age 33) (Claims RCA 5.0) May 1937 to date with FWA, WPA, as Associate Engr., and (since April 1940) Asst. Archt. Engr., Eng. Sec.

CROWLEY, JOHN BERNARD (Junior), New York City. (Age 32) (Claims RCA 2.0 RCM 1.7) April 1939 to date Engr. with Clifford Goes, New York City; previously with Gibbs & Hill, Inc., New York City.

CUMMINS, JOHN ROBERT, Baltimore, Md. (Age 30) (Claims RCA 8.9) Jan. 1938 to date with Cummins Constr. Corporation as Vice-Pres. and Gen. Mgr.; previously with Eng. Contr. Corporation, as Executive Secy., Project Mgr., and Vice-Pres.

DICKMAN, W. BERNARD (Junior), Piedmont, Calif. (Age 33) (Claims RCA 6.9) March 1941 to date Engr. and Supt. for Cahill Bros. and B. C. Gerwick, Inc.; previously Asst. Engr. and Engr., San Francisco Bay Exposition Co.; Senior Constr. Inspector for U. S. Navy Dept., Alameda Naval Air Station; with E. T. Lesure, Oakland, Calif.; Civ. Eng. Inspector, Public Utilities Comm., City and County of San Francisco.

DOUGLASS, JAMES CARL, Grand Junction, Colo. (Age 30) (Claims RCA 2.9 RCM 1.1) March 1936 to date with Bureau of Reclamation, Denver, Colo., as Levelman, Jun. Engr., Asst. Engr., and (since May 1941) Associate Engr.

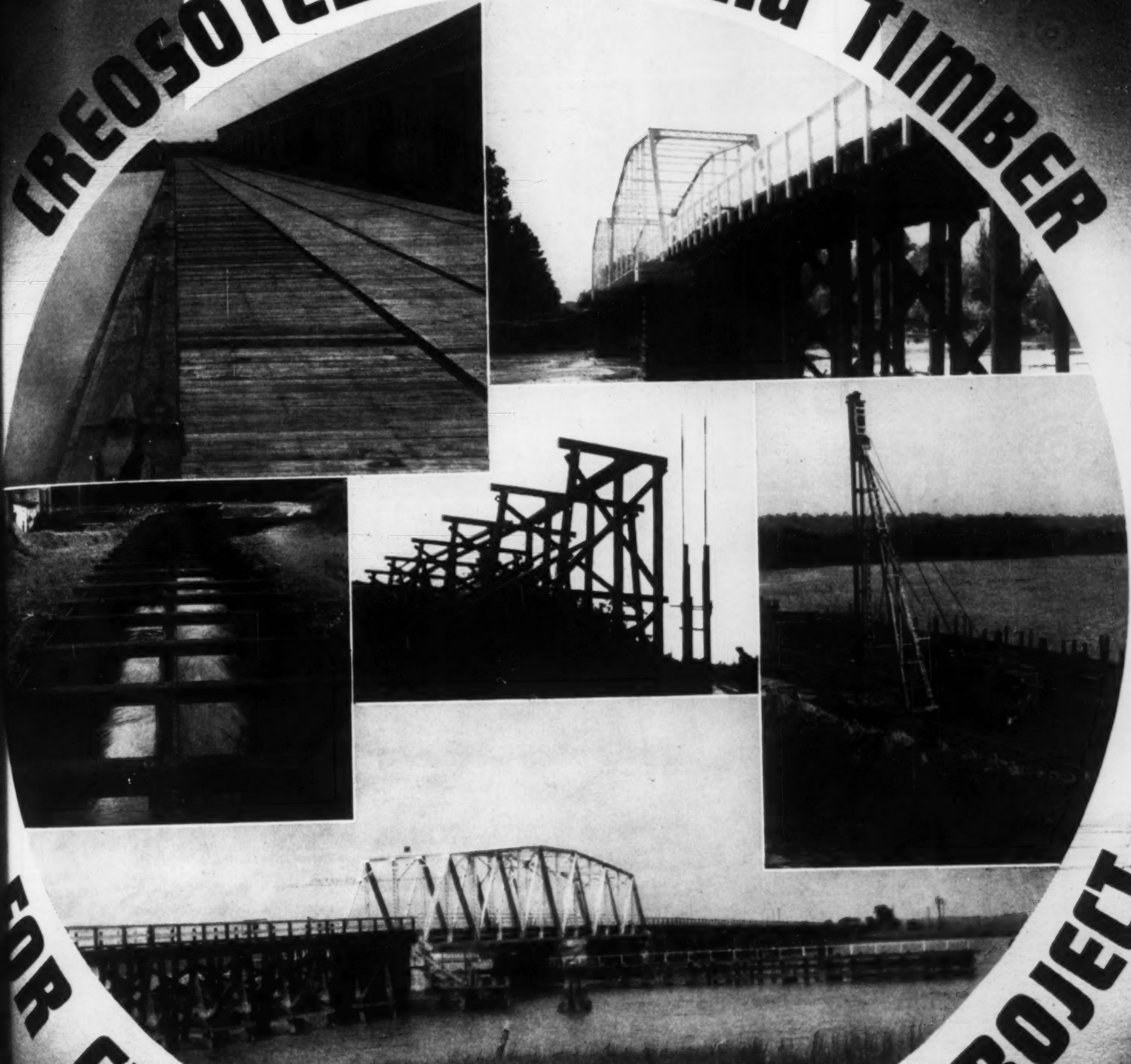
ELIOT, MILTON EARL, Dallas, Tex. (Age 27) (Claims RCA 2.9) July 1936 to date with Mosher Steel Co., as Detailer, Checker, and (since June 1939) Chf. Engr.

FELDT, HAROLD WALTER, Tulsa, Okla. (Age 30) (Claims RCA 4.2 RCM 0.5) Nov. 1933 to date with U.S. Engr. Office as Inspector, Jun. Engr., Asst. Engr. and (since Dec. 1941) Associate Engr., Hydraulics.

FEREN, JOHN MICHAEL, Waco, Tex. (Age 29) (Claims RCA 7.7) March 1942 to date Draftsman, Highway Dept., Bluebonnet Coustrs., Bluebonnet Ordnance Plant; previously on private surveying; Airport Inspector, Howard, Needles, Tammen & Bergendoff, SW PG.; with Wyandotte County Engr.'s Office, Kansas City, Kans.

AMCRECO

CREOSOTED PILES and TIMBER



FOR EVERY CONSTRUCTION PROJECT

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL
CREOSOTING
COMPANY
INCORPORATED

AMCRECO
LOWRY PROCESS
CREOSOTED WOOD

GEORGIA
CREOSOTING
COMPANY
INCORPORATED

ADDRESS INQUIRIES TO CHICAGO, ILL., OR LOUISVILLE, KY.

Fetters, Howard Frederick (Junior), Butte, Mont. (Age 32) (Claims RCA 3.7) Dec. 1941 to date Evaluation Engr., Montana Power Co.; previously Asst. Bridge Project Engr., State Highway Comm. of Indiana; Engr., Board of Public Works, Menominee, Mich.; Draftsman and Res. Engr., Shoecraft, Drury and McNamee, Cons. Engrs., Ann Arbor, Mich.; with City Engr., Pontiac, Mich., as Draftsman.

Gee, Robert Eugene (Junior), Riverside, Calif. (Age 33) (Claims RCA 5.3) July 1934 to date with Riverside (Calif.) Cement Co., as Draftsman, Engr., and (since Jan. 1937) Chf. Engr.

Griffiths, John David (Junior), Kensington, Md. (Age 32) (Claims RCA 4.0 RCM 1.0) April 1942 to date Lt. (jg), U.S. Navy, Bureau of Yards and Docks; Sept. 1941 to April 1942 Chf. Structural Inspector, U.S. Engrs., Arlington, Va.; previously with Office of Quartermaster General, War Dept., Washington, D.C.

Groshko, John Ivan, Detroit, Mich. (Age 39) (Claims RCA 14.3) April 1929 to date with Wayne County Road Comm. as Field Engr. and Office Engr.

Guillermety, Luis Manuel, Jr., Santurce, Puerto Rico. (Age 34) (Claims RCA 2.9 RCM 9.0) Aug. 1932 to date with Dept. of Interior, Government of Puerto Rico, since Nov. 1941 being Civ. Engr., Chf. of Eng. Div. for Piers and Harbors in Island of Puerto Rico.

Haberer, John Charles (Junior), Middletown, N.Y. (Age 32) (Claims RCA 3.1 RCM 3.6) Sept. 1938 to date with Div. of Sanitation, New York State Dept. of Health, as Jun. San. Engr., and (since Nov. 1941) Asst. San. Engr. and Dist. Engr.; previously Asst. Biochemist, Water Bureau, Utica.

Hattrup, Richard Adolph (Junior), Bahrein Island, Persian Gulf. (Age 30) (Claims RCA 3.2 RCM 0.5) March 1938 to Dec. 1940 and April 1942 to date with California Arabian Standard Oil Co., as Engr., and (since March 1940) Asst. Res. Engr.; June 1934 to March 1938 Jun. Engr., and April 1941 to April 1942 Job Engr., Standard Oil Co. of California.

Hesselmeyer, Harry Leonard (Junior), Palo Alto, Calif. (Age 30) (Claims RCA 5.5) Aug. 1934 to date Engr., Gen. Eng. Dept., Standard Oil Co. of California.

Hibbert, Malcolm Gilchrist, Galveston, Tex. (Age 50) (Claims RCA 8.3) Sept. 1929 to date with U.S. Engr. Office in various capacities, since June 1940 Designing Engr.

Jacobi, Thomas Richard, Bedford, Ind. (Age 35) (Claims RCA 8.5 RCM 4.1) Nov. 1940 to date Asst. and Chf. Engr., Russell B. Moore Co., Indianapolis; previously Appraisal Engr., Property and Plant Engr., Public Service Co. of Indiana; Cost and Progress Engr., Ulen & Co., Lebanon, Ind., and New York City.

Jaedicke, Cecil Dale, Las Vegas, N.Mex. (Age 31) (Claims RCA 3.6) (July 1935 to date with SCS, as Jun. Agri. Engr., Asst. Agri. Engr., and (since March 1941) Associate Soil Conservationist.

Jenson, Theodore Bruce (Junior), Jacksonville, Fla. (Age 33) (Claims RCA 6.2 RCM 4.8) June 1941 to date Senior Engr., U.S. Engr. Office, War Dept.; Jan. 1938 to June 1941 Senior Engr., Engr.'s Dept., Minneapolis, Minn.; previously Designing Engr., PWA Project Engr's. Office, Minneapolis–St. Paul San. Dist.

Johnson, Joseph Lemual, Rolla, Mo. (Age 31) (Claims RCA 4.2 RCM 1.9) Nov. 1941 to date with E. I. Du Pont de Nemours & Co., Pyror, Okla., as Bldg. Engr., Asst. Supervisor of Patrol, and Contr. Engr.; previously with U.S. Engr. Office, on minor administrative duties and as Res. Engr.

Kenmir, Russell Collingwood, Los Angeles, Calif. (Age 34) (Claims RCA 3.1) Dec. 1941 to date Chf. Inspector, J. M. Montgomery & Co.; previously Water Supply Engr., Shanley Van Teylingen & Henningson; Res. Engr. for Taylor and Taylor; Draftsman to Jun. Engr., Metropolitan Water Dist. of Southern California.

Kevan, Glenn Herman (Junior), Topeka, Kans. (Age 32) (Claims RCA 6.0) Feb. 1931 to date with Kansas Highway Comm., as Chainman, Levelman, Asst. Chf. of Party, Asst. Designer, Associate Engr., and (since Dec. 1940) Senior Engr.

Koch, Roy Deforis, Morgan City, La. (Age 35) (Claims RCA 3.1) Feb. 1941 to Jan. 1942 Inspector of Constr., U.S. Naval Ordnance Plant, and Jan. 1942 to date Senior Inspector of Constr., U.S. Naval Dry Docks; previously Jun. Engr., National Park Service, Richmond, Va.; Adjudicator, Railroad Retirement Board, Washington, D.C.

McCormick, Alexis, Corpus Christi, Tex. (Age 56) (Claims RCA 19.9) Jan. 1942 to date City Engr.; previously Engr., Montgomery County, Tex.; County Engr., Hardin County; in private engineering practice.

McKnight, James Watson (Junior), Erie, Pa. (Age 32) (Claims RCA 3.9 RCM 1.0) Jan. 1941 to date with Portland Cement Association, Philadelphia Dist., as Field Engr.; previously with Dept. of Works, Allegheny County, Pittsburgh, as Draftsman, Asst. Engr., Chf. of Party, and Designer.

Marrone, Adolph Alfred (Junior), Mount Vernon, N.Y. (Age 29) (Claims RCA 1.6) Nov. 1938 to date with U.S. Navy as Jun. Naval Archt., and Inspector of Constr. with Bureau of Yards and Docks, and (since Aug. 1941) with Public Works Sec., New York Navy Yard; previously with Madigan-Hyland, Cons. Engrs.

May, John Robinson, Langhorne, Pa. (Age 35) (Claims RCA 4.7) June 1933 to date with Delaware River Joint Toll Bridge Comm., as Concrete Inspector, Transitman, Inspector, Chf. of Party, Asst. Engr., and (since Aug. 1940) Engr. of Surveys and Plans.

Parsons, Paul Gates (Junior), Los Angeles, Calif. (Age 31) (Claims RCA 3.3) Oct. 1938 to date Eng. Asst. (A), Civ. Eng. Dept., Southern California Gas Co.; previously Constr. Inspector for U.S. Engr. Office, Inspection Div.; with Los Angeles (Calif.) County Flood Control Dist.

Pruitt, John Edwin, Mobile, Ala. (Age 37) (Claims RCA 5.0) April 1934 to March 1938 and Aug. 1939 to date with U.S. Engr. Office, as Constr. Foreman, Inspector, Asst. Supt., and (since Aug. 1941) Asst. Supt. of Constr., Brookley Field, Mobile, Ala., in the interim Asst. Supt., WPA, New York City, and Asst. Constr. Engr., Bureau of Yards & Docks, U.S. Navy Dept., Jacksonville, N.C.

Redding, John Howard, Diablo Heights, Canal Zone. (Age 44) (Claims RCA 3.3 RCM 11.0) July 1940 to date Asst. Chf. of Sec., Bldg. Sec., Special Eng. Div., Panama Canal; previously Contr. Engr. at Cali, Valle, Colombia.

Soucek, Edward (Junior), Diablo Heights, Canal Zone. (Age 32) (Claims RCA 4.7 RCM 3.2) April 1939 to Dec. 1941 Prin. Asst. to Chf. of Hydr. Sec., and Dec. 1941 to date Chf. of Sec., Special Eng. Div., Panama Canal; previously Asst. Prof. of Civ. Eng., Univ. of Toledo; Research Engr., Iowa Inst. of Hydr. Research.

Stevens, James Winlock (Junior), Austin, Tex. (Age 32) (Claims RCA 7.0 RCM 0.3 Aug. 1932 to date with Texas Highway Dept., in various capacities since Feb. 1942 being Designing Engr.

Thompson, Henry Loren (Junior), Moscow, Idaho. (Age 30) (Claims RCA 1.0) Sept. 1938 to June 1941 Instructor, and Sept. 1941 to date Asst. Prof. of Civ. Eng., Univ. of Idaho; in the interim Designing Engr., John W. Cunningham & Associates, Portland, Ore.; previously Office Engr., Robert W. Hunt Co., Engrs., Chicago.

Uffelman, Thomas Neil, Jr. (Junior), S. Nashville, Tenn. (Age 29) (Claims RCA 3.4) April 1942 inducted into U.S. Army; May 1942 appointed Asst. Engr., with rank of ensign (CEC) U.S.N.R.; Sept. 1941 to March 1942 Chf. of Party, R. L. Kenan and Associates, Brookley Field, Mobile, Ala.; previously Jun. Engr. (Civil), Aberdeen (Md.) Proving Grounds, Design Sec., A & A Div.

Weber, Adolph Carl, University City, Mo. (Age 33) (Claims RCA 11.4) June 1930 to date with Laclede Steel Co., as Draftsman, Asst. Engr. and Foreman, Works Engr., and (since Sept. 1934) Sales Engr., construction steel, St. Louis, Mo.

Webster, Howard Elwyn (Junior), Fort Pepperrell, Newfoundland. (Age 32) (Claims RCA 3.7 RCM 1.0) Sept. 1933 to date with U.S. Army in various capacities, at present Major, Corps of Engrs.

Whitesell, Dolphus Emanuel, Waco, Tex. (Age 34) (Claims RCA 4.7 RCM 1.4) March 1942 to date Highway Engr., Bluebonnet Constructors; previously Airport Engr., with Howard, Needles, Tammen & Bergendoff, and Russ & Harrison, with F. C. Tucker Co.; Asst. Engr. and Office Engr. with City Planning Comm., Indianapolis.

Worley, Hugh, Jr., Alexandria, La. (Age 40) (Claims RCA 8.1 RCM 10.1) May 1932 to date Engr., Estimator and Constr. Supt., Barber Bros. Co., Baton Rouge, La.

APPLYING FOR JUNIOR

Adams, John Amos, Jr., Las Vegas, N.Mex. (Age 27) Sept. 1935 to date with SCS, U.S. Dept. of Agriculture, as Under Eng. Aide, Jun. Eng. Aide, Eng. Aide, and (since June 1941) Jun. Agri. Engr.

Chin-Park, Edward, Dayton, Ohio. (Age 23) (Claims RCA 1.6) 1940 B. in Architecture, Mass. Inst. Tech.; April 1941 to date Jun. Architectural Engr., U.S. Engr. Office, Wright Field, Dayton, Ohio; previously graduate student, School of Design, Harvard Univ.; Architectural Designer and Structural Engr. for Archie Riskin & H. Feer, Archts., Boston, Mass.

Colarusso, Michael John, Jackson Heights, N.Y. (Age 26) (Claims RCA 0.8) Sept. 1940 to date with Corps of Engrs., U.S. Army as Senior Eng. Aide, Senior Inspector, Chf. of Survey Parties, and (since April 1942) Associate Engr.; previously with F. A. Snow Co., Contrs.; Senior Eng. Aide, Dept. of Sewerage, Metropolitan Dist. Comm., Boston.

Donovan, Richard Julian, Worcester, Mass. (Age 24) Nov. 1940 to date with U.S. Engr. Office as Asst. Engr., Massena, N.Y., and (since March 1942) Asst. to Res. Engr.; Canton, N.Y., previously Jun. Engr. (Civ.), Federal Power Comm., Washington, D.C.; with Metropolitan Dist. Water Supply Comm., Boston; Field Engr. with Swanson-Janson Constr. Co., Worcester.

Martin, Alvin Marcile, Galveston, Tex. (Age 22) 1941 B.S., Tex. A. & M. Coll.; March 1941 to date Jun. Engr., U.S. Engr. Office.

Pekarsky, Abraham Louis, Brooklyn, N.Y. (Age 27) (Claims RCA 1.6) Sept. 1939 to date Topographical Draftsman, City of New York, Borough Pres. of Manhattan; previously Draftsman, with U.S. Navy Yard, Brooklyn, N.Y., and Brooklyn (N.Y.) Bureau of Sewers (WPA).

Stiemke, Robert Edward, Royal Oak, Mich. (Age 27) (Claims RCA 1.3) Sept. 1940 to date Instructor, Eng. Mechanics and Civ. Eng., Wayne Univ., Detroit, Mich.; previously Research Asst., Hydr. and San. Lab., Univ. of Wisconsin, Madison; Inspector, U.S. Engr. Office, Milwaukee.

Thompson, Morgan Houghton, Jr., Diablo Heights, Canal Zone. (Age 29) Sept. 1941 to date Senior Eng. Aide to Prin. Eng. Aide, Special Eng. Div., The Panama Canal; previously Draftsman (Mech.) for Brown & Sharpe Mfg. Co.; with U.S. Engr. Office as Surveyman to Asst. Eng. Aide to Eng. Draftsman, Memphis, Tenn.

Voelker, Raymond Fred, Madison, Wis. (Age 28) (Claims RCA 1.3) Dec. 1939 to date Instructor in Civ. Eng., Univ. of Wisconsin; previously Jun. Engr. Inspector, FWA, PWA, Washington, D.C.; Res. Engr., Hillsboro (Wis.) sewage-treatment plant and interceptors.

1942 GRADUATES

UNIV. OF CIN.

(C.E.)

	Age
Guran, John Daniel	(24)
Krapp, Leo Friedmann	(23)
Sale, Robert Clay	(22)

COLO. STATE COLL.

(B.S. in C.E.)

Colgate, Donald	(26)
Costanza, Samuel Ross	(23)
Gray, Stanley Eugene	(22)
Hepting, Harry Claude	(23)
Kuehster, Otto Theodore	(23)
Macpherson, Thomas Buchanan	(29)
Manley, Murray Edward	(26)
Moore, Frank Donald	(26)
Moreland, Milton Bruce	(22)
Rasmussen, George Edward	(25)

(B.S. in Gen. Eng.)

Parker, Walter Underwood	(26)

GA. SCHOOL TECH.

(B.S. in C.E.)

Bell, James Tommie, Jr.	(20)

UNIV. OF MD.

(B.S.)

Shulman, Fred	(22)

PURDUE UNIV.

(B.S.C.E.)

Stahl, Laddie L	(20)

TULANE UNIV.

(B.E. in C.E.)

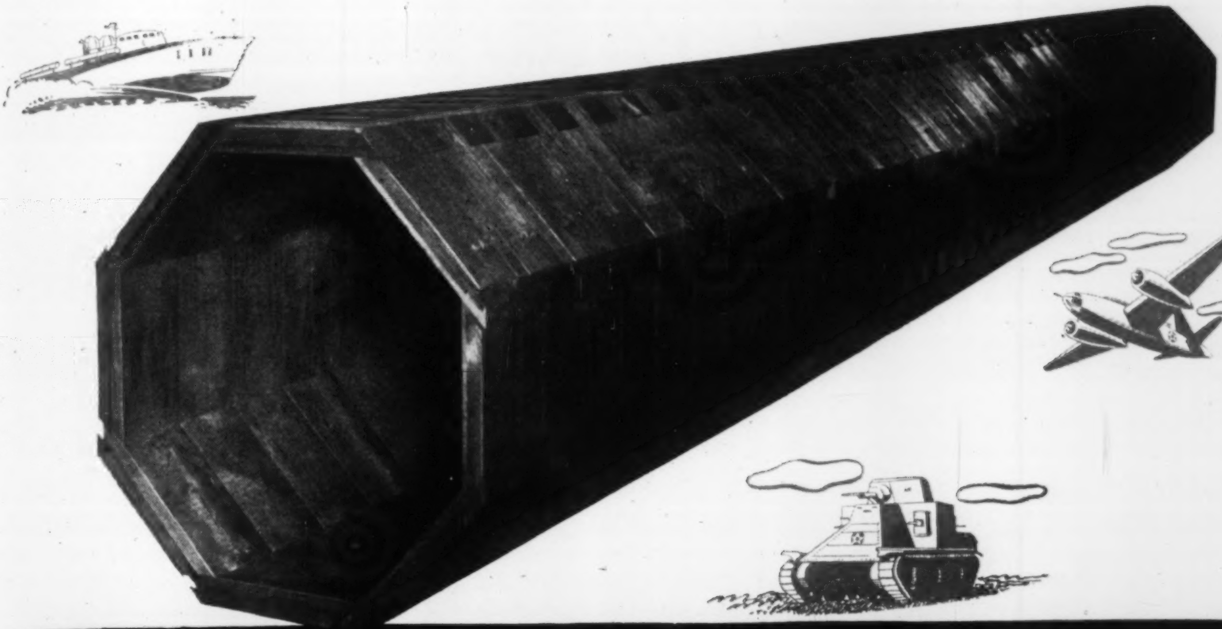
Douglas, Walter Edwin, Jr.	(21)
Earl, Holmes	(20)
Ewin, James Perkins, Jr.	(23)
Goldman, William Scott	(21)
Grehan, Bernard Albert	(20)
Hudson, William Otis, II	(24)
Manson, Spalding Kenan, Jr.	(20)
Shields, Santos Vincent	(21)

UNIV. OF WASH.

(B.S. in Civ. Eng.)

Forrey, Roland Paul	(30)
Trotland, Donald Walter	(25)
Wong, Guy King	(25)

The Board of Direction will consider the applications in this list not less than thirty days after the date of issue.



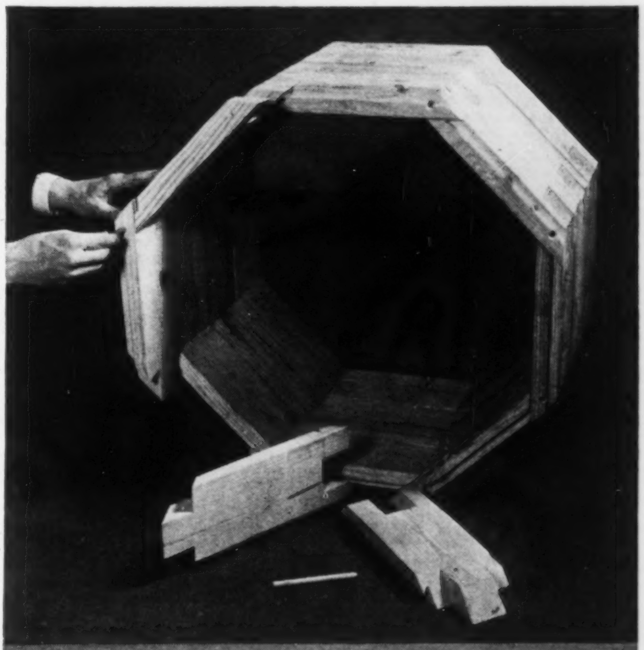
This New Drainage Pipe
SAVES METAL FOR WAR!

Steel, a critical war material, must not be used in any drainage structure except where engineering integrity demands it. Yet here is a practical war-time substitute. It's the new Armco Emergency Pipe, designed by a drainage engineering organization with 38 years' experience.

This completely new design in wood drainage structures meets war-time emergency requirements. Steel bands, metal reinforcing or other critical materials are not required. The semi-flexible design provides ample strength to meet engineering standards. Yet Emergency Pipe is light in weight for easy handling. Installation cost is low. There is no field assembly except joining long sections of any length that can be hauled and handled. Skilled labor is not needed.

On the durability side, Armco Emergency Pipe performs admirably as a war-time structure. It goes "all-out" in meeting the War Production Board's requirements for substituting non-critical materials wherever possible.

Use the Armco Emergency Pipe for culverts, storm sewers, underpasses, conduits—or wherever else drainage structures are needed and vital materials must be conserved. Your request will bring full data. Armco Drainage Products Assn., 545 Curtis St., Middletown, O.



The patented Emergency Pipe design utilizes short wood sections to impart beam strength and wood dowels to eliminate nails.

ARMCO

ARMCO EMERGENCY PIPE

Engineering Societies Personnel Service, Inc.

NEW YORK
31 W. 39TH ST.

CHICAGO
211 W. WACKER DR.

DETROIT
100 FARNSWORTH AVE.

SAN FRANCISCO
57 POST ST.

BOSTON
4 PARK STREET

The items listed below have been furnished by the Engineering Societies Personnel Service, Inc., which is under the joint management of the Four Founder Societies. This service is available to members and is operated on a cooperative, non-profit basis. In applying for positions advertised by the Service the applicant agrees, if actually placed in a position through the Service as a result of these advertisements, to pay a placement fee in accordance with the rates as listed by the Service. These rates have been established in order to maintain an efficient, non-profit personnel service and are available upon request. This also applies to registrants whose notices are placed in these columns. All replies should be addressed to the key numbers indicated and mailed to the New York Office.

A weekly bulletin of engineering positions open is available to members of the cooperating societies at a subscription of $3 per quarter or $10 per annum, payable in advance.

MEN AVAILABLE

Structural and Concrete Designer and Draftsman; M. Am. Soc. C.E.; experienced in steel mill construction and building work; also general engineering work. Available in 10 days. C-922.

Civil Engineer; M. Am. Soc. C.E.; 6 years' field experience on bridges, harbor improvements, and large buildings; 7 years' designing bridges, marine structures, and concrete and steel buildings; wants position carrying responsibility. C-923.

Graduate Civil Engineer; Assoc. M. Am. Soc. C.E.; over 30 years' experience in design, construction, operation, and management of water, gas, and electric utilities. Specialty water and sewerage systems for municipal and private corporations and for cantonment. Consultants for utilities for many U.S. Army posts in East; desires position as an executive. C-924.

POSITIONS AVAILABLE

Construction Engineers (*a*) Large industrial company desires Construction Engineers with C.E. or M.E. degree who have had several years' experience on industrial plant construction, power-house construction of national defense plants being built for the government in South and Middle West. (*b*) Junior Engineers with construction layout experience. Apply by letter giving full particulars regarding experience, age, college and year of graduation, degree, citizenship, present salary and salary expected, by whom employed, and references. Enclose small photograph. Company will keep confidential. Y-9146.

Structural Layout Men or Structural Detailers, either over 40 with considerable experience, or younger if less experienced. Require a combination of structural steel, machine design, and sheet metal design. Location, Pennsylvania. Y-9480.

Civil and Structural Engineer with experience in stress analysis and design of timber trusses, bridges, and other structures in timber building construction and design, materials testing laboratory, and research on wood and wood structures. Post-graduate education in mechanics and structural analysis preferred. Salary, $3,800–5,600 a year. Location, Middle West. Y-9589.

Structural Engineer (*b*) who has had some design, steel, and reinforced concrete experience. Salary, $5,000 a year. Location, foreign. Y-9621.

Estimator familiar with reinforced concrete buildings and general building construction in the New York Metropolitan area. Salary, $2,600–$3,380 a year. Location, New York, N.Y. Y-9689.

Structural Engineer, 30–50, graduate civil engineer with at least four or five years' experience in design of fabricated steel buildings and reinforced concrete structures. Should know strength of materials and, if possible be a registered professional engineer or have sufficient background to obtain license. Salary, $3,000–$3,600 a year. Permanent. Location, Middle West. Y-9711.

Mechanical and Civil Engineers with extensive recent experience in design of appropriate phases of construction involved in erection of large, modern, reinforced-concrete office building. Salary, $2,600–$3,200 a year. Location, South. Y-9823.

Draftsman (*b*) Structural Engineers for steel and reinforced concrete buildings. (*c*) Reinforced Concrete Bar Detailers. Location, South. Y-9838.

Concrete Designer with considerable experience necessary, preferably on power-plant construction. Salary open. Location, New England for three to four months, then New York, N.Y. W-50.

Instructor, 23–30, graduate civil engineer, preferably with an M. S. degree, to teach civil engineering subjects in a New England university. Permanent. Salary, $1,800 a year. W-67.

Structural Designers and Draftsmen (*a*), concrete and steel, preferably with power-house experience. Salaries, $3,000–$3,600 a year. Location, Wilmington, Del. W-127.

Graduate Civil Engineer who has had a good educational course in soil mechanics as well as some practical experience in that field. Laboratory man is not wanted. Some knowledge of foundation design would be helpful. Temporary. Salary, $2,000–$2,600 a year. Location, New York, N.Y. W-136.

Junior Field Engineer for line and grade work in the field. Must be able to run a transit and wye level but will not be in charge. Apply by letter giving full particulars. Salary dependent upon qualifications. Location, South. W-251.

Superintendent to handle the erection of large contracts covering oil-refinery equipment. Location, New Jersey. W-342.

Surveyor's Transitmen Salary, $2,340 a year for six 8-hour days per week; $2,730 a year for six 10-hour days per week. Location, Virginia. W-347.

Engineers. (*b*) Construction Engineer to act as assistant to project manager for large, heavy construction project—that is, breakwater quarries and railroad systems. Salary, $7,500–$10,000 a year. (*c*) Construction Plant and Planning Engineer skilled in construction equipment of all kinds, capable of planning work, and acting as assistant to construction engineer. Salary, $7,200 a year. Location, West Indies. W-350.

Superintendent of Materials and Supplies capable of handling materials in shipbuilding yards; includes disposition of all incoming freight, proper storage, and final disposition to ships and control of warehouses and inter-plant traffic. Apply by letter stating experience, education, references, and salary desired. Location, Mississippi. W-355.

Instructor and Associate Professor. (*a*) Assistant or Associate Professor in Civil Engineering. Major will be in fluid mechanics, sanitary and water supply engineering. Also will teach basic courses such as mechanics, surveying, strength of materials. M.S. degree preferred. Practical experience also desirable. Salary, $2,900–$3,200 a year for 10 months' service. (*b*) Instructor in civil engineering. Will teach highways, soil mechanics. M.S. degree desirable. Salary, $2,200–$2,400 a year for 10 months' service. Location, East. W-360.

Junior Engineer for making take-offs. Some office drafting, especially shop drawings for reinforcing steel in connection with concrete construction. Location, Maryland. W-364.

Graduate Civil Engineer, young, to work on time and production reports. Must be able to handle men and assume responsibilities. Will act as assistant to executive. Salary open. Location, New York, N.Y. W-381.

Estimators who have had good all-around experience in the construction field. Must be capable of working without direction. Salary open. Location foreign. W-393.

Designers and Draftsmen who have had some good structural experience as draftsmen for detailing work. Structural timber experience would be helpful. Location, New York City, with some work in northern New York State. Salary open. Duration, the emergency. W-394.

Engineers (*a*) Office Engineer experienced in survey computation work, computing maps of the subdivision of property, particularly curvilinear layouts. Should be fair draftsman. Salary, $3,380–$3,640 a year. (*b*) Instrumentmen experienced in the use of transit and level in types of survey work in connection with laying out property, roads, sewers, buildings. Salary, $3,120–$3,380 a year. Location, Virginia. W-397.

Civil Engineer, Contractor's Engineer, young, for pier-repair work. Should have some experience in pile driving, timber, or waterfront work. Half time in office and field. Salary, $2,400–$3,000 a year. Location, Staten Island, N.Y. W-399.

Mechanical and Structural Designers and Draftsmen, preferably with experience in cranes or hoists or similar experience. Salary open. Location, New York, N.Y. W-405.

Civil or Mechanical Engineer, 45–55, with 10 years' heavy construction experience, for government work to advise contractors, construction engineers, etc. Must be sufficiently versed to meet top people, size up in a day's time, progress and state of affairs of a job, and make sensible comments and suggestions. Considerable traveling. Salary, $3,800–$5,600 a year. Location, Washington, D.C. W-410.

Hydraulic or Soil Mechanics Engineers, not immediately subject to draft. Hydraulics Division engaged in study of designs for power dams, waterways, and harbor and navy yard facilities. Soil Mechanics Division is carrying on laboratory and field investigations of foundations for dams, levees, airports, and soil stabilization. Salaries: Junior Engineer, graduate or assistant engineer, graduate plus several years' experience, $2,000–$2,600 a year. Location, South. W-443.

Structural Designer, Concrete Designer, and Field Engineer. Salaries, $3,600–$4,800 a year. Location, Louisiana. W-445.

Civil Engineers with about 10 years' broad and progressive professional civil and sanitary engineering experience, including several years in utilities (water distribution, sewerage, storm drainage, and if possible, gas distribution), highway and general design and construction. Work will be in connection with site improvements and site utilities in the areas outside the buildings. Some traveling. Salary, $3,200–$3,800 a year. Location, Washington, D.C. W-490.

Estimator, about 45, to take off quantities on reinforced concrete tanks and elevating machinery. Permanent. Salary, $4,160 a year. Location, New York, N.Y. W-516.

Construction Superintendent who has had highway bridge experience; reinforced concrete. Duration, about 8 months. Location, New York State. W-519.

RECENT BOOKS

New books of interest to Civil Engineers donated by the publishers and filed in the Engineering Societies Library, or in the Society's Reading Room, will be found listed here. The notes regarding the books are taken from the books themselves and are edited by members of the staff of the Society or of the Library. Those books which are in the Library may be borrowed by mail by Society members for a small handling charge.

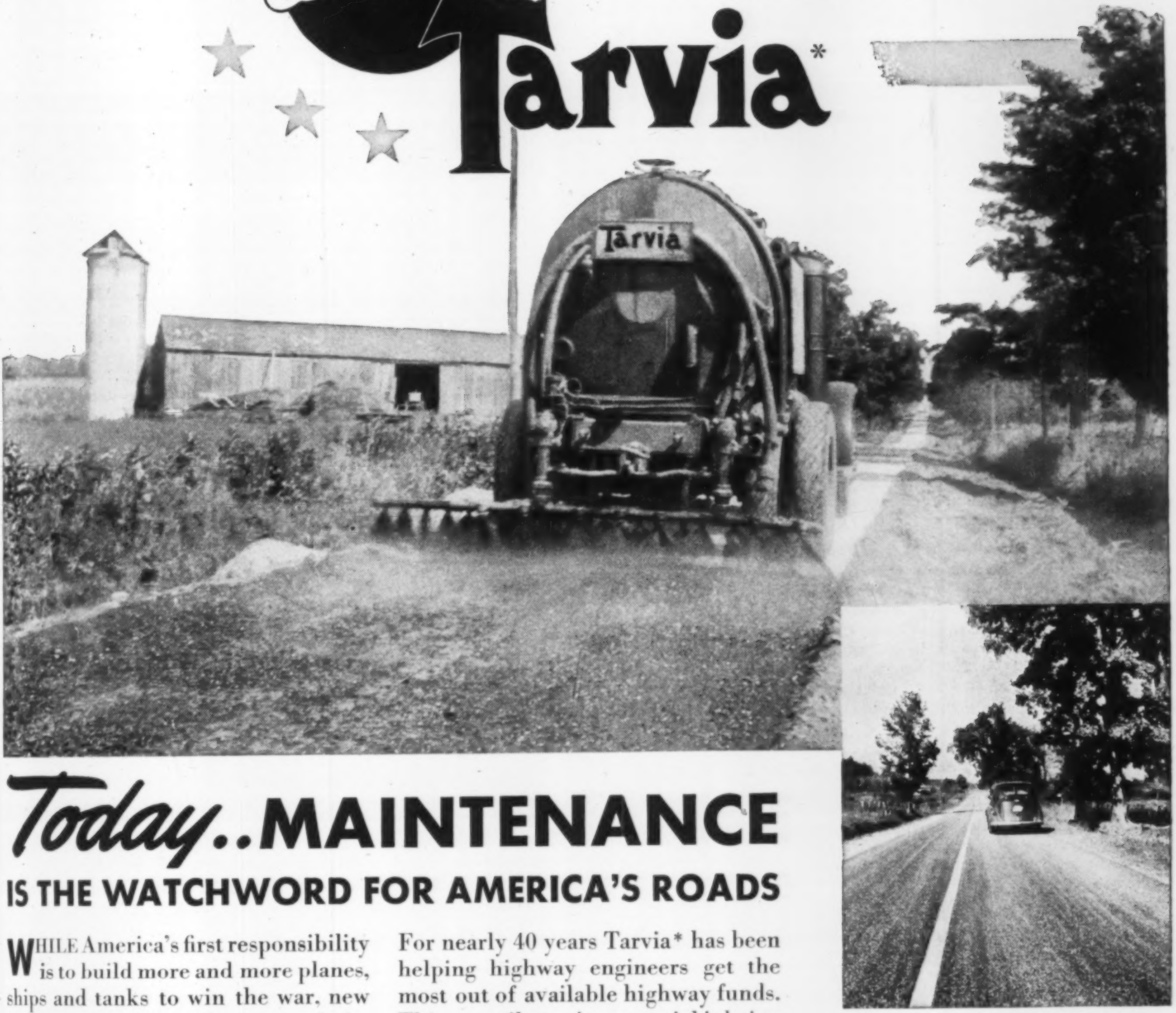
Technidata Hand Book, Engineering, Chemistry, Physics, Mechanics, Mathematics, etc. By E. L. Page. Norman W. Henley Pub. Co., New York, 1942, 64 pp., diagrs., charts, tables, $8^{1}/_{2} \times 5^{1}/_{2}$ in., looseleaf, paper, $1.00; cloth, $1.50.

Essential data taken from the fields of mathematics, physics, chemistry, and engineering mechanics are presented in condensed form. Facts, figures, theory, definitions, laws, formulas, simple calculations, diagrams, and numerical tables are all utilized. The use of the slide rule is also briefly exemplified.

What the Citizen Should Know About the Army Engineers. By Lt. Col. Paul W. Thompson. New York, Norton and Company, Inc., 1942 210 pp., illus. diagrs., $8^{1}/_{2} \times 5^{1}/_{2}$ in., cloth, $2.50.

The enhanced role of the engineer in modern warfare, as well as the many peace-time pursuits of the Corps of Engineers, is described in detail in this volume. The history of the Corps, which dates back to Washington's day, is outlined, the modern aspects of the story being implemented with case histories from recent campaigns in Europe.

Barrett Tarvia*



Only the most economical maintenance is necessary to make a Tarvia road last indefinitely—smooth, easy-riding, skid-safe. Send for your copy of the new Tarvia Manual.

Today..MAINTENANCE

IS THE WATCHWORD FOR AMERICA'S ROADS

While America's first responsibility is to build more and more planes, ships and tanks to win the war, new road construction will necessarily be limited by military requirements . . .

But not so maintenance!

Now and for the duration, "stitch-in-time" road work is more important than ever. It is soundly economical, vitally necessary . . . not only for strategic, cross-continent highways, but also for the equally important farm-to-market roads that are the backbone of our highway system.

For nearly 40 years Tarvia* has been helping highway engineers get the most out of available highway funds. This versatile paving material is being used with outstanding success to extend the life and service of all types of highways. It is annually saving taxpayers heavy replacement costs.

Why not discuss your road problems with the Tarvia field man? You'll find him ready with helpful advice and cooperation—based upon Barrett's unmatched paving experience. Phone, wire or write.

Barrett
Tarvia
MANUAL

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK

Chicago · Birmingham · St. Louis · Detroit · Philadelphia · Boston · Providence · Rochester
Lebanon, Pa. · Minneapolis · Cleveland · Columbus · Youngstown · Toledo · Syracuse · Hartford
Norwood, N. Y. · Cincinnati · Buffalo · Bethlehem · Portland, Me.
In Canada: THE BARRETT COMPANY, LTD., Montreal · Toronto · Winnipeg · Vancouver

. . . ONE OF AMERICA'S GREAT BASIC BUSINESSES

*Reg. U. S. Pat. Off.

Completed On Time!

"Never have so many, owed so much, to so few!"

That brilliant statement made by Britain's Winston Churchill can be applied to a case in our own country.

Today, millions of soldiers, sailors and marines are being supplied with an abundance of safe water from Layne built Well Water Systems. The Armed Forces can thank less than two thousand Layne Organization employees. In an amazingly short period of time, they undertook—and *completed on time*—the most gigantic Well Water System building task ever accomplished in this, or in any other country. These widely experienced men located water bearing sands, drilled wells in almost every type of earth formation and set tons of casing. Furthermore they built the pumps, made installations and placed their water systems in operation—producing hundreds of millions of gallons of water daily.

Such outstanding service, performed without delay or failure, has created a brilliant chapter in the long and successful career of the Layne Organization. No greater commendation for ability, speed and efficiency could be offered.

LAYNE & BOWLER, INC.
Memphis, Tenn.

LAYNE
PUMPS & WELL WATER SYSTEMS

Affiliated Companies

Layne-Arkansas Company .... Stuttgart, Ark.
Layne-Atlantic Company .... Norfolk, Va.
Layne-Bowler New England Corp. .. Boston, Mass.
Layne-Central Company .... Memphis, Tenn.
Layne-Northern Company .... Mishawaka, Ind.
Layne-Louisiana Company ...... Lake Charles, La.
Louisiana Well Company .... Monroe, La.
Layne-New York Company .... New York City
Layne-Northwest Company ...... Milwaukee, Wis.
Layne-Ohio Company .... Columbus, Ohio
Layne-Texas Company .... Houston, Texas.
Layne-Western Company .... Kansas City, Mo.
Layne-Western Co. of Minn. .... Minneapolis, Minn.
International Water Supply, Ltd. .. London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

Current Periodical Literature

Abstracts of Magazine Articles on Civil Engineering Subjects

Selected items for the current Civil Engineering Group of the Engineering Index Service, 29 West 39th Street, New York, N.Y. Every article indexed is on file and may be borrowed from the Engineering Societies Library. Photoprints will be supplied at the cost of reproduction, 25 cents per page to members of the Founder Societies (30 cents to all others), plus postage.

BRIDGES

BIBLIOGRAPHY. History of Suspension Bridges in Bibliographical Form, A. A. Jakkula, *Tex. Agric. & Mech. College—Eng. Experiment Station—Bul. No. 57*, vol. 12, no. 7, July 1, 1941, 546 pp. Bridges have been arranged chronologically according to date of completion and references to articles arranged chronologically according to date of publication. Publication of Cooperative Investigation of Bridge Types by Public Roads Administration and Agricultural and Mechanical College of Texas.

CONCRETE. Schiefwinklige Bahnueberfuehrung bei Glattfelden, P. E. Soutter. *Schweizerische Bauzeitung*, vol. 118, no. 17, Oct. 25, 1941, pp. 193–197. Reinforced concrete highway bridge over double-track railroad, with incline of 51 deg, replaces old brick construction at Glattfelden, Switzerland; report is presented on both preliminary tests with gypsum model and actual load test on finished bridge; dimensioning of structure, especially of reinforcing elements.

CONCRETE, SWITZERLAND. Eisenbetonbaulkenbruecke ueber den Rhein bei Felsberg, E. Rathgeb. *Schweizerische Bauzeitung*, vol. 118, no. 3, July 19, 1941, pp. 26–27. Bridge of reinforced concrete construction across Rhine at Felsberg; built in 1934–1935, concrete bridge replaces former wooden structure; structure has 87-m span, and carries roadway 4.5 m wide and pedestrian path 1 m wide on each side; few details of construction are given.

RAILROAD. Bridge Span Installed in Fast Time. *Can. Transportation*, Feb. 1932, pp. 61–64. Double-track span of unusual design, over 117 ft long and weighing 1,600,000 lb, was placed in position in Canadian National Montreal-Ottawa double-track main line, near Dorval, in about 6 hours, without interruption to traffic; manner in which work was carried out is described.

RAILROAD. This C.N.R. Bridge Designed to Economize in Steel. *Ry. Age*, vol. 112, no. 14, Apr. 4, 1942, pp. 691–692 and 694. Description of Canadian National structure spanning highway subway in which savings were effected by constructing deck largely of reinforced concrete.

CONCRETE

CONCRETE. Progress Report on Reflectivity of White Portland Cement Concretes, C. W. Muhlenbruch. *Concrete*, vol. 50, no, 1, Jan. 1942, pp. 8–10 and 16. Results of investigation now in progess in Materials Testing Laboratory of Carnegie Institute of Technology; apparatus used to determine reflectivity of white portland cement concretes; loss in reflectivity of specimens subjected to atmospheric exposure during summer months shown graphically.

CONSTRUCTION, PUMP PLACING. Pumping High-Early-Strength Concrete on Building Construction. *Concrete*, vol. 50, no. 3, Mar. 1942, pp. 2–4. Lehr Construction Co., St. Joseph, Mo., has constructed building for Western Tablet Co., of St Joseph, using Pumpcrete and pipe lines system of concrete placement; results of experience provide study both for relative pumpability of high-early strength cement and Pumpcrete system applied to reinforced concrete building construction.

DESIGN. Combined Bending and Thrust or Pull, A. G. Boorman. *Concrete & Constr. Eng.*, vol. 37, no. 2, Feb. 1942, pp. 49–52. Theoretical graphical analysis of stresses in steel reinforcement.

PRODUCTS. Incendiary-Proof Houses, A. R. Boone. *Rock Products*, vol. 45, no. 1, Jan. 1942, pp. 124 and 126. Pre-cast concrete slabs used in California to build houses for defense workers; pumice used for lightness and strength; roofs resist incendiary bombs.

PRODUCTS PLANTS. Speed Handling and Delivery of Blocks with High-Lift Fork Trucks, H. Paulson. *Concrete*, vol. 50, no. 2, Feb. 1942, pp. 18–19. Use of fork-type high-lift trucks at Geist Coal and Supply Co., Cleveland, has proved to be practical, to reduce block-handling costs materially, and to increase greatly plant's capacity for rapid service.

PROPERTIES. Strength Development of Concrete Affected by Calcium Chloride in Low Temperatures. *Concrete*, vol. 50, no. 2, Feb. 1942, p. 8. Calcium chloride increased strength of concrete at all temperatures (20 to 40 F) and all ages; value of calcium chloride in providing greater strength of concrete was most marked at lower temperatures.

RAILROAD, STRESSES. Report of Special Committee on Impact. *Am. Ry. Eng. Assn.—Bul.*, vol. 43, no. 429, Jan. 1942, pp. 360–362. Tests of short steel spans with open floor, together with effect of track inequalities and worn wheels on such spans; tests of steel spans with ballasted decks; tests of dynamic shear in steel girders and truss spans; analysis of additional data from impact tests; determination of damping factors of steel spans and variation in amount of damping with change in loading.

READY MIXED. Speed Up Defense Work Using Ready Mix, R. S. Torgerson. *Rock Products*, vol. 45, no. 1, Jan. 1942, pp. 117 and 133. Plants of Battle Creek Gravel Co., 1 mile from Fort Custer and 3 miles from Battle Creek, Mich., turn large percentage of sand and gravel production to ready-mixed concrete for airport and army camp construction.

READY MIXED. War Demands for Ready Mix. *Rock Products*, vol. 45, no. 1, Jan. 1942, pp. 100–101 and 156. Descriptive illustrated review; over 12 million cubic yards of ready-mixed concrete produced in 1941.

REINFORCEMENT, BONDS. Bond Resistance in Reinforced Concrete, R. Allin. *Civ. Eng.* (London), vol 37, no. 427, Jan. 1942, pp. 4–8. Article reviews conclusions of research on bond strength and considers their practical applications.

CONSTRUCTION INDUSTRY

AIRPORTS. In 100 Days Contractor Grades, Drains, and Paves $3,900,000 Airport. *Construction Methods*, vol. 24, no. 3, Mar. 1942, pp. 43–45, 110, 112, 114, 116, and 118. Details of construction of 825-acre airport for Willow Run bomber plant at Ypsilanti, Mich.; project involves 550,000 cu yd of earth moving, installation of 72 miles of pipe for drainage system, and laying of 153 acres of concrete paving.

FOUNDATIONS

SOILS. Classification of Soils and Control Procedures Used in Construction of Embankments, H. Allen. *Pub. Roads*, vol. 22, no. 12, Feb. 1942, pp. 263–282. Report presents revised and simplified version of soil identification and classification, as well as standard methods of test for determination of relationship of soil moisture and density; use of results obtained by testing in soil classification and construction of embankment is described; and construction methods used in control of water content and compaction of soil are given.

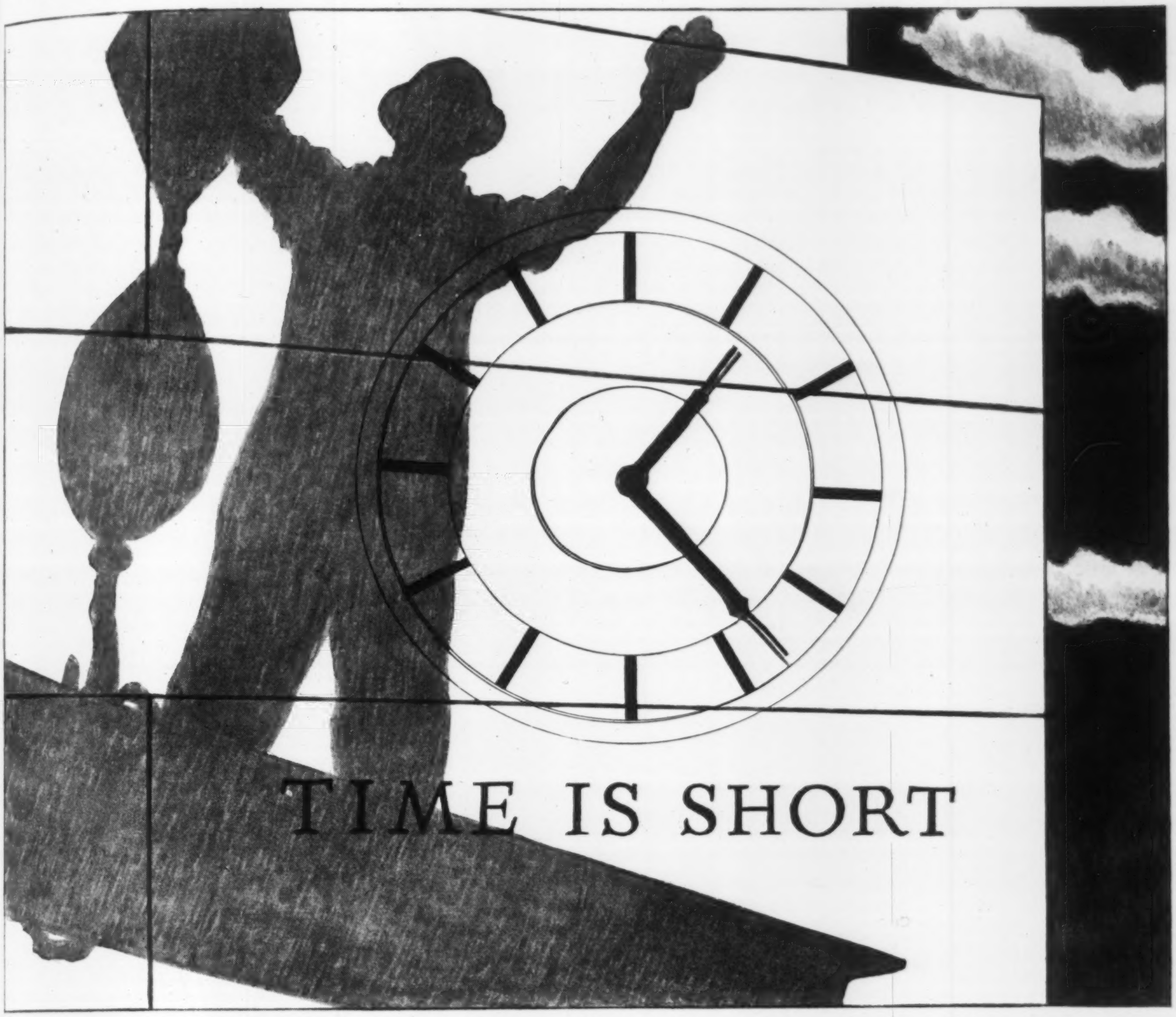
SOILS, ANALYSIS. Difficulties with Bouyoucos Method of Soil Dispersion, B. H. Knight. *Roads & Road Constr.*, vol. 19, no. 226, Oct 1941, pp. 160–161. Detailed study of results given by Bouyoucos method of soil dispersion; table shows that time of dispersion has marked effect on mechanical analysis obtained in any particular case; quartz clays are relatively resistant; calcite or limestone clays show intermediate rate of breakdown; residues from fresh dolerite show still more rapid rate of breakdown; residues from decomposed dolerite show most rapid rate of breakdown of all samples tested.

PORTS AND MARITIME STRUCTURES

OLYMPIA, WASH. Washington Port Improves Facilities. *World Ports*, vol. 4, no. 4, Jan. 1942, p. 7. Notes on work completed by Works Projects Administration at Port of Olympia, southernmost Washington point of inland salt water navigation, which has transformed harbor into well-equipped seaport.

PUBLIC WORKS ENGINEERING

MALAYA. Engineer in Malaya, C. A. Middleton Smith. *Engineer*, vol. 172, nos. 4484 and 4485, Dec. 19, 1941, pp. 426–428, and Dec. 26, pp. 446–448. Discussion of transport and social changes; prospects for engineers in Malaya; engineers in government service; public works department; methods of transport; military movements and roads; water supplies; airports; drainage and irrigation; local irrigation problems; river conservancy and hydroelectric schemes; mining.



Making *time* our ally

In this war time can fight on either side, and can change sides, as has been pointed out again and again.

Men who build with steel develop a keen sense of time, learn to know well the value of hours and minutes. The coming of the emergency, with the need to build America's arsenal largely from the ground up, found Bethlehem's Fabricated Steel Construction division already geared for speed, ready for the challenge.

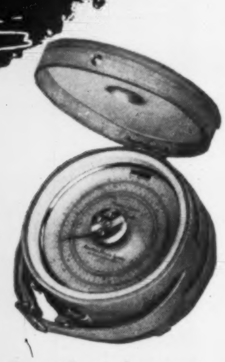
Great things, that of course cannot be described now, have been done and are being done. Steel-work for an immense aircraft plant has been fabricated and delivered weeks ahead of schedule. Steel-work for the greatest tank arsenal in the world was fabricated and erected in record time. Steel for ordnance works, power plants, hangars, arsenals—for the entire range of the emergency construction program—is being fabricated and erected on unheard-of schedules.

Bethlehem's Fabricated Steel Construction division—fabricating plants and steel-producing plants working together in complete coordination, erection depots, engineering staffs with experience that includes some of the greatest construction projects in America—is using every precious minute to help win time as our ally and keep it fighting on our side.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

Speed-Up ALL FIELD SURVEYS!



Preliminary surveys for highway construction, drainage and irrigation systems, dams, water lines, all divisions of civil engineering are speeded up by the *NEW* Paulin Precision Surveying Aneroid. Readings to two feet over a range of 4500 feet are as easy as reading a watch. Other models cover a range of **18,000** feet. Write for complete literature and FREE COPY of the *Paulin Altimetry Manual.*

AMERICAN PAULIN SYSTEM
1847 SOUTH FLOWER STREET
LOS ANGELES, CALIFORNIA

AMERICAN SOCIETY OF CIVIL ENGINEERS FOUNDED 1852

Why do so many ENGINEERS ask for all 24 of the ASCE MANUALS?

These Manuals of Engineering Practice, compiled by men of wide experience and acknowledged authority, contain information useful to the civil engineer in his every-day work. They present facts, briefly and to the point, and should be of value to you. You can get the list of Manuals published to date by mailing the coupon.

American Society of Civil Engineers
33 West 39th Street, New York, N.Y.

Please send, without obligation, complete list of 24 Am. Soc. C.E. Manuals.

Name ....
Address ....
City .... State ....

MILITARY ENGINEERING. Corps of Engineers Concentrate on Airport Work. *Western Construction News*, vol. 17, no. 1, Jan. 1942, pp. 6–11. River and harbor, flood control, and airport construction work of Corps of Engineers of U.S. Army during past year and work contemplated for immediate future in western United States discussed.

RAILROADS, STATIONS, AND TERMINALS

RAILROADS, RELOCATION. Modern American Railway Construction Methods. *Ry. Gaz.*, vol. 76, no. 6, Feb. 6, 1942, pp. 190–192. Construction of Southern Pacific main line diversion around Shasta Dam reservoir involved special measures to insure stable formation and reduce initial maintenance; unusually careful measures were also taken to provide against earthquake damage.

ROADS AND STREETS

AIRPORT RUNWAYS. Need for Scientific Design of Pavements on Military Flying Fields, W. R. Macatee. *Asphalt Inst.—Construction Series, No. 59*, 1941, 19 pp., supp. plates. Requirements of airport pavements to handle modern bombers successfully; table showing required thickness of hot mixed asphaltic concrete runway pavement on subgrades of varying ratings for supporting airplanes weighing 200,000 lb and having tire imprint area equal to 1,200 sq in. for each main landing wheel; suggested method for field evaluation of subgrade support.

ASPHALT. Trends in Asphalt Pavement Design, B. E. Gray. *Eng. News-Rec.*, vol. 128, no. 7, Feb. 12, 1942, pp. 242–244. Application of engineering principles to design of highway subgrades has greatly reduced amount of surfacing needed to make highways suitable for long service; new knowledge of load-bearing value of these subgrades makes possible simple determination of what surfacing thickness should be.

BITUMINOUS. Road Surface Characteristics, E. J. Hamlin. *Surveyor*, vol. 101, no. 2609, Jan. 23, 1942, p. 35. Experiences and treatment of slippery surfaces with consideration of amount of bitumen in surface mixture as cause of slippery pavements; consideration of proportions of bitumen and stone for non-skid road surfaces.

BRICK. Modern Brick Pavements, W. H. Cullimore. *Roads & Streets*, vol. 85, no. 1, Jan. 1942, pp. 49 and 52–53. Review of recent practice and development of centerline and traffic lane markers; bricks used for beautifying dead ends; vibrated monolithic brick construction.

BRITISH COLUMBIA–ALASKA. Twenty-Five to Thirty Millions Is Estimated Cost of British Columbia–Yukon-Alaska Highway. *Roads & Bridges*, vol. 79, no. 12, Dec. 1941, pp. 22 and 42. Proposed routes for highway through British Columbia to Yukon and Alaska; estimated cost and preliminary surveys made.

COLOMBIA. Highway Construction in Colombia. *Excavating Engr.*, vol. 36, no. 2, Feb. 1942, pp. 88–89 and 122. Some notes on present development in road constructions enabled and encouraged by introduction of excavation and other equipment purchased by government and rented to contractors.

CURVES. Developments in Curve Design, Speed and Sight Distance, C. M. Noble. *Roads & Streets*, vol. 85, no. 1, Jan. 1942, pp. 25–31. Necessity of balance between sight distance and superelevation design; factors which must be considered at construction of curvatures in territory where topography varies widely and where topography is relatively uniform; use of spiral curves in highway practice; method of attaining superelevation on Pennsylvania Turnpike. Bibliography.

DESIGN. Current Divided-Highway Design Practices. *Eng. News-Rec.*, vol. 128, no. 7, Feb. 12, 1942, pp. 273–278. Advances made recently in design of divided highways are reported; application of freeway principle is growing in acceptance as best way to maintain traffic capacity; wide median zones are more commonly used, acceleration and deceleration lanes are provided at important intersections, and channelization is employed to reduce traffic hazards; reflecting curbs of white concrete are employed to define median zones and channels of intersections.

DRAINAGE. Surface Drainage of Dual Carriageways in Open Country. *Roads & Road Constr.*, vol. 19, no. 227, Nov. 1941, pp. 178–180. Elementary outline and drawings showing plans for drainage of dual highways; surface drainage on embankments; surface drainage in cuttings; cross sections on tangents in relation to surface drainage; alternative form of cross section; position and type of gullies or catchpits.

GREAT BRITAIN. Construction of By-Pass Highway in England by Royal Canadian Engineers, J. P. Carriere. *Eng. J.*, vol. 25, no. 1, Jan. 1942, pp. 15–20. By-pass connects two main highways; one is at elevation 265 and other at elevation 135; by-pass is 6,500 ft long. Notes on grading, drainage, consolidation of fill, design of carriage-ways, underpass under railway, bridge over river, and earth work.

MAINTENANCE AND REPAIR. Maintenance and Repair of Concrete Roads, G. McL. Gibson. *Surveyor*, vol. 101, no. 2606, Jan. 2, 1942, pp. 7–8. Factors which contribute to failure of concrete roads, suggested methods of maintenance, guide for thickness and weight of reinforcement, proper jointing procedure, and correct curing times given. Before Instn. Highway Engrs.

RECONSTRUCTION. Post-War Road Reconstruction, J. Easkin. *Surveyor*, vol. 101, no. 2613, Feb. 20, 1942, pp. 67–68. Suggested methods for reconstruction of rural and urban highways; illustrated descriptions of planned motorways, cross roads, and elevated crossings.

ROADSIDE IMPROVEMENT. Trees by Side of Road, H. J. Neale. *Roads & Streets*, vol. 85, no. 2, Jan. 1942, pp. 50–57. Trees should be given consideration when planning roads and highways, not only from aesthetic point of view, but because overhanging trees form natural camouflage; some suggestions are given to landscape engineer on how to select, protect, and transplant roadside trees; literature pertaining to types of roadside trees and their planting.

SNOW AND ICE CONTROL. Removal of Snow from Roads and Footpaths, L. Williams. *Surveyor*, vol. 101, no. 2613, Feb. 20, 1942, p. 71. Use of salt and grit to control snow and ice; disadvantages of use of salt and means of overcoming them.

STABILIZATION. Cement Stabilized Base Used in 4-Lane Highway Construction, A. E. Smith. *Roads & Road Constr.*, vol. 19, no. 226, Oct. 1941, pp. 162–163. Portion of highway on U.S. 99 extending from junction with U.S. 60, at Beaumont, to Bannin, is nearing completion; project is of especial interest as it will transform existing road into four-lane divided highway and is first state highway project in this district to utilize cement stabilized base; experiments in methods; special bulldozer blade; spreading and compaction; curing seal applied.

STABILIZATION. Stabilizing Soils for Base Courses and Highway Surfacing, L. D. Hicks. *Eng. News-Rec.*, vol. 128, no. 7, Feb. 12, 1942, pp. 248–253. Low-cost surfacing for highways and airports now being provided by several methods of soil stabilization; earlier methods of improving stability of road surfaces by additions of sand, gravel, or other soils have been put on scientific basis in recent years and now are supplemented by admixtures of cement, bituminous oils, and deliquescent salts; experiments with vinsol resin are in progress; principles applied in major methods described.

UNITED STATES. Access Roads and Strategic Network. *Eng. News-Rec.*, vol. 128, no. 7, Feb. 12, 1942, pp. 271–272. During 1941 Public Roads Administration and state highway departments concentrated their operations on strategic highways network; preference also was given to access roads wherever federal-aid highway funds could be used for that purpose; results for eleven months of year, compiled by Public Roads Administration, are given—largely in tabular form.

UNITED STATES. Highways for 1942—Programs for Western States. *Western Construction News*, vol. 17, no. 1, Jan. 1942, pp. 23–26. Western state highway programs as presently established call for expenditure of about $130,000,000 during 1942; details of individual programs are given.

UNITED STATES. 1942 Highway Forecast. *Excavating Engr.*, vol. 36, no. 1, Jan. 1942, pp. 11–17 and 38–61. State-by-state forecast of planned road and highway constructions; paving work, maintenance, constructions, purchase of equipment, etc.

UNITED STATES. State Road Work and Programs. *Eng. News-Rec.*, vol. 128, no. 7, Feb. 12, 1942, pp. 257–267. Mileages of major types of highways built in 1941 in each state are given; together with state expenditures for construction, maintenance, and equipment; supplementing these figures are brief statements by state highway engineers concerning road problems raised by war and telling how shortages of critical materials are being met.

SANITARY ENGINEERING

MILITARY. Sanitation in Field in United States Army, S. A. Goldblith. *Military Engr.*, vol. 34, no. 196, Feb. 1942, pp. 86–88. Army sanitation is divided into two groups: refuse and waste disposal, and water supply; article presents general field practice of both branches of sanitation, with some technical data on quantity of water required.

SEWERAGE AND SEWAGE DISPOSAL

CAMPS, MILITARY. Sewage Disposal Problems at Army Camps, P. Hansen. *Am. J. Pub. Health*, vol. 32, no. 2, Feb. 1942, pp. 181–186. Review of special problems involved in disposal of sewage from army camps; estimates of sewage quantities and sewage characteristics; and recommendations for loadings for various sewage treatment devices likely to be used.

FLOCCULATION. Mechanical Flocculation of Sewage, J. Hurley. *Surveyor*, vol. 101, no. 2607, Jan. 9, 1942, pp. 15–16. Outline of flocculation process of sewage treatment with particular stress on its application in United States; advantages outlined with view to adoption in British practice.

GREAT BRITAIN. Sewerage and Sewage Disposal in 1941. *Surveyor*, vol. 101, no. 2610, Jan.

30, 1942, pp. 39–40. Survey of outstanding publications during 1941 dealing with operation and research in plants, plant design, filtration processes, agricultural utilization of sludge, and treatment of industrial wastes

Plant, Mansfield, Ohio. Chlorine as Aid in Control of Bulking. J. R. Turner. *Sewage Works Eng. and Mun. Sanitation*, vol. 13, no. 3, Mar. 1942, pp. 145–147. In sewage treatment plant of activated sludge type, chlorine has proved to be best means in bulking control; diagrams given show operating conditions at plant; brief notes on cleaning diffuser plates.

Plants, Marion, Ind. Vacuum Filtration Problems at Marion, Ind., D. Backmeyer. *Sewage Works Eng. & Mun. Sanitation*, vol. 13, no. 3, Mar. 1942, pp. 140–142. Brief notes on sewage treatment plant of activated-sludge type, with BOD equivalent of 35,000 population; detailed description of sludge filtration systems, consisting of 7,500-gal storage well, chemical conditioning tank, 200 sq ft area vacuum filter, precision feeder for iron solution, and feeder for hydrated lime.

Refuse Disposal, Great Britain. Refuse Collection and Disposal. *Surveyor*, vol. 101, no. 2609, Jan. 23, 1942, pp. 33–34. Brief review of refuse collection and disposal, discussing power from waste, garbage-sewage plants, salvage methods, fertilizer production, refuse-collecting vehicles, and snow-clearance problems.

Sewers, Design. Comments on Drainage, L. B. Escritt. *Surveyor*, vol. 101, no. 2611, Feb. 6, 1942, pp. 47–48. Development and presentation of formula which aids in simplifying computations for sewer design; formula embodies intensity of rainfall in terms of fall of land and distance travelled by flow of water; run-off and soakway capacities and silting of sewers considered.

Sludge. Compost. Sludge and House Refuse, J. L. Davies. *Instn. Mun. and County Engrs.—J.*, vol. 68, no. 6, Dec. 9, 1941, pp. 184–189. Results obtained from process in which disposal of sludge is achieved by mixing with house refuse to form fertilizer; house refuse is first screened to remove clinker, all salvageable materials extracted, and residue crushed; scheme has been in operation over 4 years, with very satisfactory results.

STRUCTURAL ENGINEERING

Welded Steel Structures. Residual Stresses in Welded Structures, H. E. Rossell. *Mar. Eng. and Shipg. Rev.*, vol. 47, no. 2, Feb. 1942, pp. 101–102 and 106. Examples of residual stresses in welded structures; probable history of locked up stresses in all-welded ship speculated in light of test results such as those reported in article and elsewhere.

TRAFFIC CONTROL

Transportation, War-Time. Transportation Development and Prospects, R. Budd. *Ry. Age*, vol. 112, no. 1, Jan. 3, 1942, pp. 9–11 and 17. In outlining physical resources and accomplishments of nation's transportation during period of national preparedness program, author has attempted to present concise review of system which now comprises integral part of war effort.

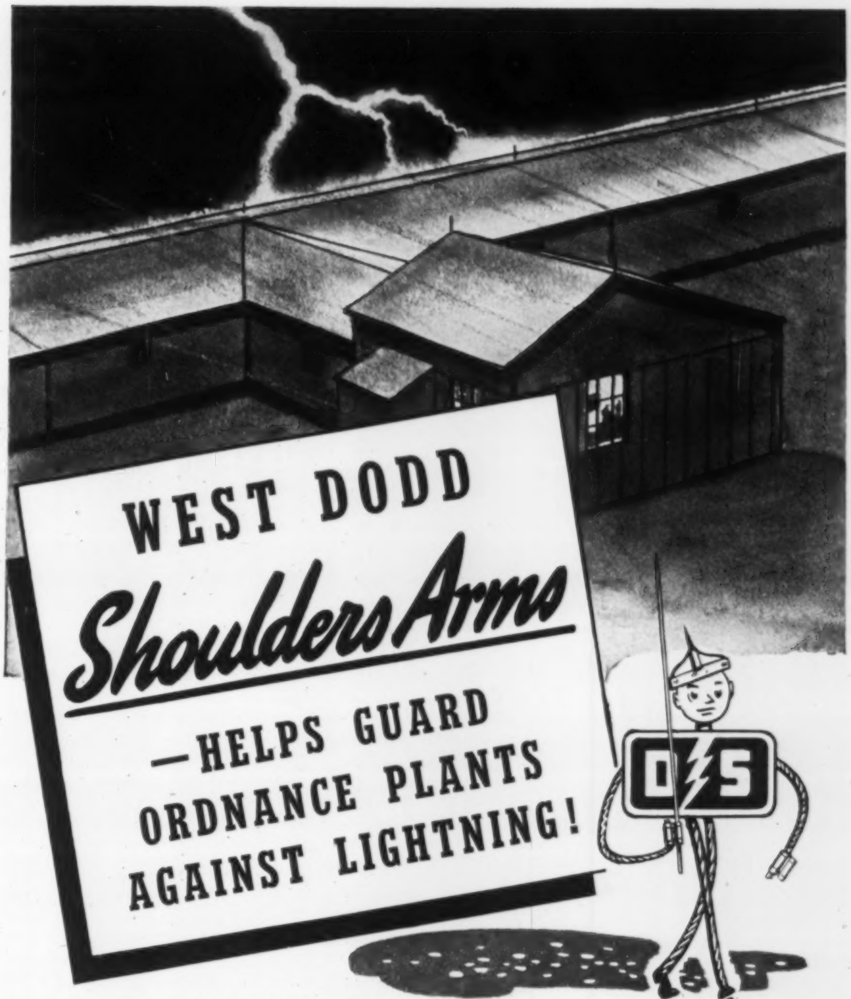
TUNNELS

Construction, Dust Control. Control of Dusts, Fumes, Gases in Delaware Aqueduct Tunnel, W. B. Harris. *Gen. Contractors Assn.—Bul.*, vol. 33, no. 1, Jan. 1942, pp. 4–6. Dust determinations were made on one shaft-sinking operation, and without use of any ventilation; concentration of 13 million particles per cu ft was found during drilling; positive ventilation was then introduced at rate of 1,800 cu ft per min; fog cleared immediately, visibility was restored, and dust concentration averaged $7^1/_2$ million particles per cu ft.

Spillways. Distribute Concrete by Pipe Line in Tunnel for Dam, C. Campbell. *Concrete*, vol. 50, no. 1, Jan. 1942, pp. 2–4 and 15. Notes on design and construction of outfall tunnel for Marshall Creek Dam, Kans.—mining operations, lining procedure, form work, placing concrete, arch concrete.

Ventilation. Ventilating System for Continental Divide Tunnel. *Engineering*, vol. 152, no. 3963, Dec. 26, 1941, p. 510. Boring of eastern end of tunnel is being carried out by S. S. Magoffin Co., Estes Park, which has installed ventilating system claimed to be most effective yet devised; by installation of system, it is stated, time required for each drilling cycle has been reduced by 20 min; average rate of advance has been increased by 6 ft per day.

Water Supply, New York. Unusual Method of Driving Tunnel Safely in Fractured Rock Formation Carrying Water Under High Static Pressure, S. H. Ash and P. S. Miller. *Am. Inst. Min. & Met. Engrs.—Advance Paper* mtg. Feb. 1942, 11 pp. (mimeographed). Description of method used in driving Rondout-West Branch tunnel of Delaware Aqueduct, through Contract No. 313; section is 75,057 ft long and is opened by 3 shafts, 825, 1,551, and 839 ft; through most of its length, ground gives off methane; exploratory core drilling; heading and safety bulkheads; draining; advancing drifts and main bore. Bibliography.



★ West Dodd lightning protection and static control equipment is being widely used in all parts of the country to help safeguard ammunition loading lines, underground ammunition magazines, standard ammunition magazines and bag loading buildings.

The chance of lightning halting, or slowing up, vital war production is also eliminated in many industrial plants by West Dodd protection of the power stack.

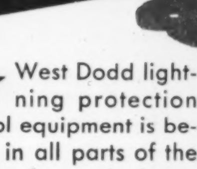
THE PLUS FACTORS

In the two vital factors of experience and responsibility, West Dodd provides a plus. For West Dodd is a consolidation of the 12 largest manufacturers in the field, including the pioneers of *approved* lightning protection, with the wealth of their experience in all phases of the work. Thus a contract with West Dodd is an assurance of prompt delivery, complete cooperation and satisfactory application.

FULLY APPROVED

West Dodd materials and methods of installation are passed by the National Board of Fire Underwriters', American Institute of Electrical Engineers, and other competent authorities. Conductors, points, bus terminals, connectors, point supports, ground plates, and other accessories produced by West Dodd are inspected and labeled in the plant by Underwriters' Laboratories, Inc.

West Dodd will render full assistance in planning the installation and estimating costs. Write or wire, today.



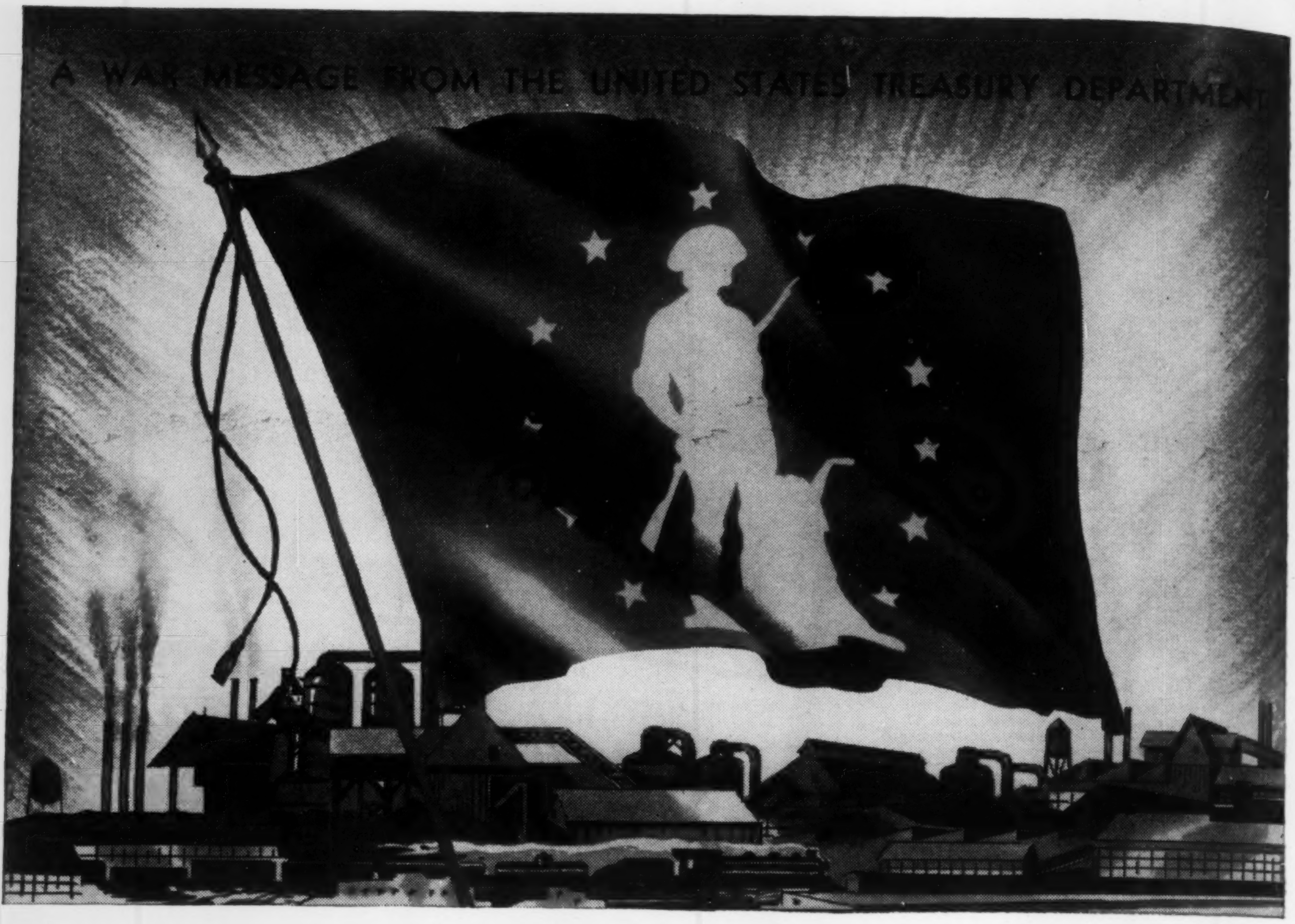
The exclusive West Dodd easy-on, solderless, bonding clamp. Note how boss provides greater number threads so screw slippage is practically eliminated. This clamp is one of many West Dodd features especially developed to meet U. S. Government requirements. Eliminates hand wrapping and soldering. Is quicker to install. More permanent. Forms better electrical bond. Made of copper-bronze, tinned when necessary to prevent electrolitic corrosion. 16 sizes.

WEST DODD
LIGHTNING CONDUCTOR CORP.

A RELIABLE PROTECTION AGAINST A LEADING CAUSE OF FIRE

D S

GOSHEN, INDIANA


A WAR MESSAGE FROM THE UNITED STATES TREASURY DEPARTMENT

Next to the Stars and Stripes . . .

AS PROUD A FLAG AS INDUSTRY CAN FLY

Signifying 90 Percent or More Employee Participation in the Pay-Roll Savings Plan

IT doesn't go into the smoke of battle, but wherever you see this flag you know that it spells Victory for our boys on the fighting fronts. To everyone, it means that the firm which flies it has attained 90 percent or more employee participation in the Pay-Roll Savings Plan . . . that their employees are turning a part of their earnings into tanks and planes and guns *regularly,* every pay day, through the systematic purchase of U. S. War Bonds.

You don't need to be engaged in war production activity to fly this flag. Any patriotic firm can qualify and make a vital contribution to Victory by making the Pay-Roll Savings Plan available to its employees, and by securing 90 percent or more employee participation. Then notify your State Defense Savings Staff Administrator that you have reached the goal. He will tell you how you may obtain your flag.

If your firm has already installed the Pay-Roll Savings Plan, now is the time to increase your efforts: (1) To secure wider participation and reach the 90-percent goal; (2) to encourage employees to increase their allotments until 10 percent or more of your gross pay roll is subscribed for Bonds. "Token" allotments will not win this war any more than "token" resistance will keep our enemies from our shores, our homes. If your firm has yet to install the Plan, remember, TIME IS SHORT.

Write or wire for full facts and literature on installing your Pay-Roll Savings Plan now. Address Treasury Department, Section D, 709 12th St., NW., Washington, D. C.

Make Every Pay Day "Bond Day"

U. S. WAR Bonds ★ Stamps

This Space is a Contribution to Victory by the American Society of Civil Engineers

WATER RESOURCES

Conservation. Grand River Conservation, M. Pequegnat. *Water & Sewage*, vol. 79, no. 10, Oct. 1941, pp. 36, 38, 62, 64, 66, and 69. Review of sewage-dilution and flood control difficulties necessitating Shand Dam.

Mexico. La conservacion y el uso del aqua en Mexico, C. Jimenez Lopez. *Revista Mexicana de Ingenieria y Arquitectura*, vol. 20, no. 1, Jan. 1942, pp. 3–9. Conservation and use of water in Mexico. Large part of Mexico is arid, particularly in north. Where mountain ranges contribute to rainfall, tendency of rivers is to be torrential; remedy is essentially engineering problem. While progress has been made in river regulation, generation of electric power, and irrigation, all is but small part of what may be developed in future. Bibliography.

Ohio. Public Water Supplies and Control of Stream Pollution in Ohio, F. H. Waring. *Ohio State Univ.—Eng. Experiment Station—Cir.*, no. 41, vol. 10, no. 5, Sept. 1941, 24 pp. Historical review of public water supply in Ohio; recent developments in water supply and purification, water and sewage treatment; reduction in typhoid fever and general death rates coincident with improved water supply and sewage treatment; table of historical and statistical summary of water supply, water works, and sewage treatment plants.

WATER TREATMENT

Effect of Water on Food. Watch Your Water Supply—It Affects Food Quality, K. G. Weckel. *Food Industries*, vol. 14, no. 1, Jan. 1942, pp. 47–50. Water can affect quality of food products in multitude of ways; even water used for cleansing purposes is likely to leave deposits that change flavor, odor, or color. Some of things to guard against in water properties, and what to do to overcome water difficulties, are set forth.

Mobile Chlorination. Mobile Chlorinator for Emergency Use. *Engineering*, vol. 153, no. 3964, Jan. 2, 1942, p. 5. Brief illustrated description of chlorinator developed by Wallace & Tiernan Co., Newark, N.J.; apparatus is intended for towing behind motor car or other vehicle; operating unit consists of gasoline engine rated at 5 hp at 1,600 rpm, driving pump capable of delivering 22 gpm against 400-ft head.

Plants, Lancaster, Pa. Operating Results at Lancaster, Pa., N. N. Wolpert. *Water Works Eng.*, vol. 95, no. 2, Jan. 1942, pp. 76–80. Account of methods used at purification plant with particular attention to feeding chemicals, clarifier, filter beds, and laboratory.

Seawater, Salt Removal. Potable Water from Sea-Water, A. Parker. *Nature* (London), vol. 149, no. 3772, Feb. 14, 1942, pp. 184–186. Attention directed to some of possible methods of removing salt from seawater to produce potable water, and their limitations; composition of seawater; distillation; absorption of water vapor; freezing; hydrates; osmosis and electroosmosis; chemical precipitation; base exchange and acid exchange.

Softening. Lime Softening Graphically Studied, H. O. Hartung. *Water Works and Sewerage*, vol. 88, no. 12, Dec. 1941, pp. 539–544. Graphs presented which illustrate results of experiments conducted on lime softening; although specially prepared samples were used, process is applicable to many other waters; types of softening curves presented and indicated results discussed; first hardness precipitation is calcium hardness; excess lime for magnesium precipitation; hardness precipitation by calcium carbonate stability test.

Softening, Threshold Treatment. Scale Prevention by Threshold Treatment. *Eng. and Boiler House Rev.*, vol. 55, no. 8, Feb. 1942, pp. 266 and 268. Details of process developed by Keith Piercy Ltd., Oldbury, Birmingham, which consists in application of low concentrations of Calgon (sodium hexametaphosphate) in water, amount required being usually of order of 2 lb per 100,000 gal of water.

WATER WORKS ENGINEERING

Protection. Water Supply Protection in U.S. Coastal States. *Water Works Eng.*, vol. 95, no. 2, Jan. 1942, pp. 90–91 and 102–103. Outline of plans for protection of water systems in states that border the two oceans.

War Time, Protection.. Wartime Protection of Water Supply Systems, J. D. Lewin and M. J. Popper. *Pub. Works*, vol. 73, no. 1, Jan. 1942, pp. 30 and 32–34. Suggestions, based on European experience, for preparing to meet increased demands and for protecting dams and other existing facilities.

Water Wells, Ranney System. Ranney System of Underground-Water Collection. *Engineering*, vol. 152, no. 3961, Dec. 12, 1941, pp. 461–463. Illustrated description of system which enables one well to drain large water-bearing area and ensures that choking of area immediately around collecting screen is prevented or delayed; system also permits flushing of ground around collectors. It is claimed that one Ranney collector can produce as much as 10 vertical wells in same formation.

FOUNDATIONS
PRETEST UNDERPINNING
TUBA STEEL CYLINDERS
MASS CONCRETE CONSTRUCTION

SPENCER, WHITE & PRENTIS, INC.
NEW YORK, N. Y.

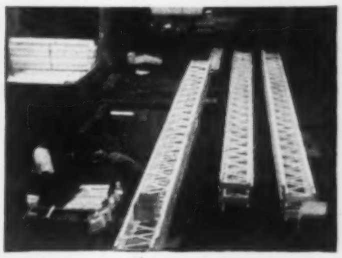
One of the Country's Largest, Most Modern Galvanizing Plants planned and manned for

PROMPT DELIVERIES
on orders of any size!

We're known—well known—for finest quality work to meet the most exacting specifications . . . we have the facilities, the personnel *and the experience!*

Shipment by boat, truck or any railroad. *Galvanized products furnished.*

To economize, galvanize at Enterprise.



ENTERPRISE GALVANIZING CO.

2501 E. CUMBERLAND ST., PHILADELPHIA, PA. ★ Suppliers to the U. S. Govt. for over 40 years

It can be your Library Department

A trained staff and a fully equipped library would be a valuable addition to your company. The Service Bureau of the Engineering Societies Library can be that new department in your organization, yet more adequately manned and better equipped than any individual organization library could possibly be.

Use this service. Over 4,000 bibliographies on engineering subjects are on file. 150,000 engineering texts and files of every worth while periodical are available for further research to meet your specific needs. A letter, a telephone call or a telegram will place the Service Bureau at your service.

Use the service of your Engineering Library. The charges cover only the cost of the service and represent but a fraction of the value you will receive.

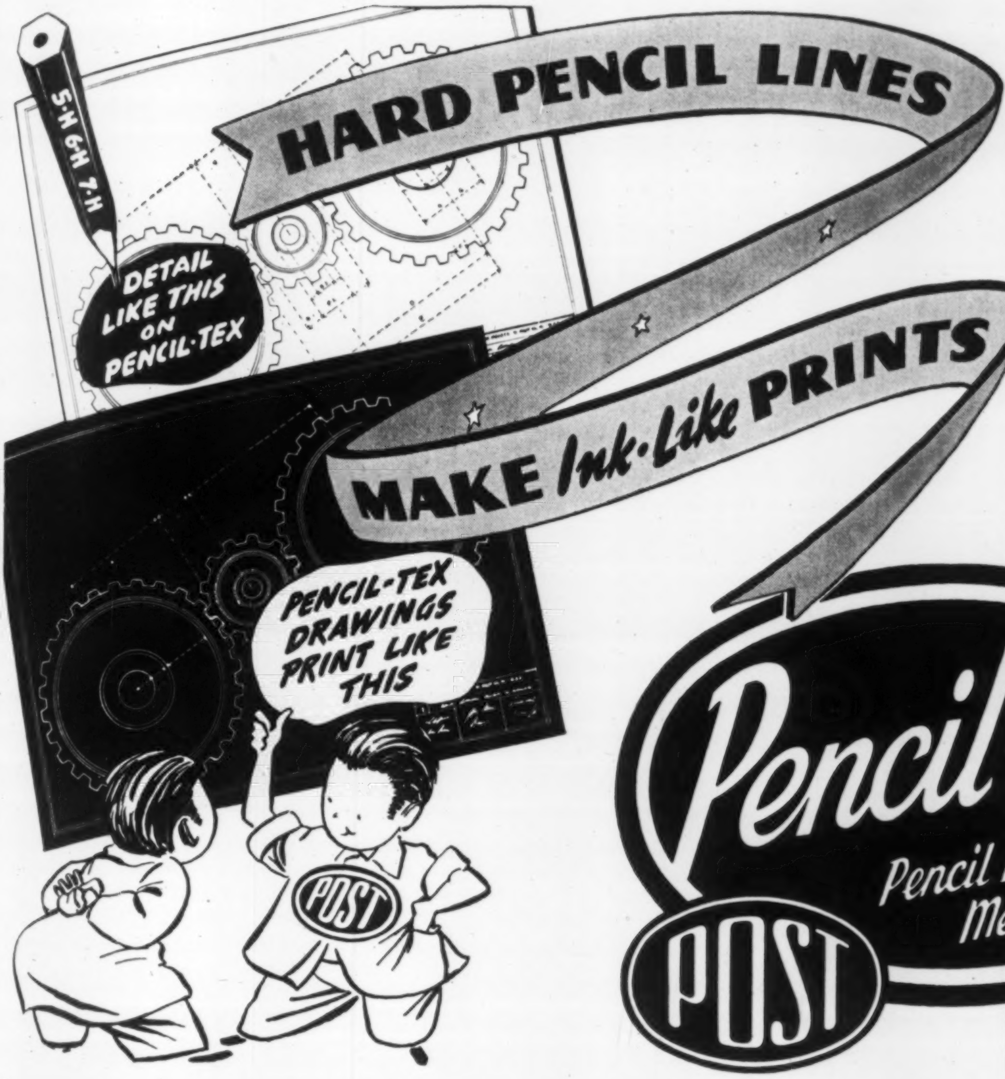
The Engineering Societies Library

29 West 39th Street
New York, N.Y.

INDEX OF PRODUCTS

- Acetylene
  - Air Reduction Sales Co.
- Acetylene Generators
  - Air Reduction Sales Co.
- Airport Drainage
  - Armco Drainage Products Assn.
  - Lock Joint Pipe Co.
- Air Raid Shelters
  - Armco Drainage Products Assn.
- Altimeters
  - American Paulin System
- Aluminum, Structural
  - Aluminum Co. of America
- Arc Welding Equipment
  - Lincoln Electric Co.
- Asphalt Plank Bridge and Industrial Flooring
  - Philip Carey Mfg. Co.
- Bars, Aluminum
  - Aluminum Co. of America
- Bars, Iron and Steel
  - Bethlehem Steel Co.
- Blower Pipe, Steel, for Ventilation Purposes
  - Lock Joint Pipe Co.
- Blue Print Papers
  - Frederick Post Co.
- Borings, Test
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Bridges
  - Bethlehem Steel Co.
- Bridge Planks, Mineral Surfaced Asphalt
  - Philip Carey Mfg. Co.
  - Johns-Manville Corp.
- Buildings, Steel
  - Bethlehem Steel Co.
- Cables, Electric
  - Lincoln Electric Co.
- Caissons
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Cement, High - Early - Strength Portland
  - Lone Star Cement Corp.
- Cement, Portland
  - Lone Star Cement Corp.
- Chemical Feeds
  - Permutit Co.
- Coagulation Equipment, Floc Formers, Sludge Removers, Settling Tanks
  - Permutit Co.
- Concrete Admixtures
  - Johns-Manville Corp.
- Concrete Reinforcement
  - Bethlehem Steel Co.
- Conductors, Lightning
  - West Dodd Lightning Conductor Corp.
- Contractors
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Corrugated Sheets, Aluminum
  - Aluminum Co. of America
- Corrugated Sheets, Asbestos-Cement
  - Johns-Manville Corp.
- Creosoted Piles, Poles, Ties and Timber
  - American Creosoting Co.
- Cribbing, Metal
  - Armco Drainage Products Assn.
- Culverts, Asbestos-Cement
  - Johns-Manville Corp.
- Culverts, Cast Iron
  - Cast Iron Pipe Research Assn.
  - U. S. Pipe & Foundry Co.
- Culverts, Corrugated Iron and Sheets
  - Armco Drainage Products Assn.
- Culverts, Reinforced Concrete
  - Lock Joint Pipe Co.
- Damp-Proof Compounds
  - Barrett Division, Allied Chemical and Dye Corp.
  - Philip Carey Mfg. Co.
- Deaerators and Degasifiers
  - Permutit Co.
- Drafting Instruments and Materials
  - Keuffel & Esser Co.
  - Frederick Post Co.
- Drafting Room Furniture
  - Frederick Post Co.
- Drains, Perforated Iron
  - Armco Drainage Products Assn.
- Drains, Reinforced Concrete
  - Lock Joint Pipe Co.
- Drawing Supplies
  - Keuffel & Esser Co.
- Engineers
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Engineering Instruments
  - American Paulin System
  - Keuffel & Esser Co.
- Engineering Tapes and Scales
  - Frederick Post Co.
- Expansion Joints, Asphalt or Cork
  - Johns-Manville Corp.
- Filler, Asphalt
  - Philip Carey Mfg. Co.
- Flooring, Aluminum
  - Aluminum Co. of America
- Flooring, Asphalt Tile
  - Johns-Manville Corp.
- Flux, Welding, Brazing, Etc.
  - Air Reduction Sales Co.
- Foundations
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
  - Union Metal Manufacturing Co.
- Galvanizing and Galvanized Products
  - Enterprise Galvanzing Co.
- Gas Density Indicators and Recorders
  - Permutit Co.
- Gauges, Acetylene, Oxygen
  - Air Reduction Sales Co.
- Generators, Electric
  - Lincoln Electric Co.
- Inks, Waterproof, Pigment, Drawing
  - Keuffel & Esser Co.
- Instruments
  - American Paulin System
  - Buff & Buff Co.
  - Keuffel & Esser Co.
- Iron Removal Equipment
  - Permutit Co.
- Joints, Expansion, Paving
  - Barrett Division, Allied Chemical & Dye Corp.
  - Philip Carey Mfg. Co.
- Lettering Guides
  - Keuffel & Esser Co.
- Levels
  - Buff & Buff Co.
  - Keuffel & Esser Co.
- Lightning Protection
  - West Dodd Lightning Conductor Corp.
- Machinery, Pipe Cutting and Bevelling
  - Air Reduction Sales Co.
- Measuring Tapes
  - Keuffel & Esser Co.
- Metal Connectors for Timber Joints
  - Timber Engineering Co.
- Metal Termite Shields
  - Timber Engineering Co.
- Meters, Electric
  - Lincoln Electric Co.
- Motors, Electric
  - Lincoln Electric Co.
- Nickel and Its Alloys
  - International Nickel Co., Inc.

Continued on page 30


HARD PENCIL LINES
MAKE Ink-Like PRINTS
5-H 6H 7-H
DETAIL LIKE THIS ON PENCIL-TEX
PENCIL-TEX DRAWINGS PRINT LIKE THIS
POST

Pencil-Tex
Pencil Drafting Medium
POST

INK-LIKE RESULTS AT PENCIL SPEED

The advantages of working *with Pencil*-TEX become apparent first when you work *on* it. Its new surface—*Blu-white,* microscopically smooth, invites your pencil to speed while retaining razor-sharp definition. It *feels* different. Look at that pencil line from the back—thru *Pencil*-TEX. Compare a similar pencil line seen thru any medium you are now using. The superior, solid density of the *Pencil*-TEX line anchored to *Pencil*-TEX cuts smudging and is responsible for clarity, sharpness, and keen-edged lines in prints. A hard pencil and *Pencil*-TEX will speed up your work *now* when every drawing deserves the permanence that *Pencil*-TEX will give it.

PHONE POST AND PEP-UP PRODUCTION

GET YOUR FREE TRIAL NOW

Because we know *Pencil*-TEX will be your important ally once you've tried it, we have prepared a generous trial supply. At our expense, prove to yourself the superiority of *Pencil*-TEX. Free trial samples — actual work size sheets — are yours for the asking. At the right is the name of your local Post dealer. 'Phone him for your free trial supply of *Pencil*-TEX or send your request direct to:

THE FREDERICK POST CO., BOX 803, CHICAGO

POST

INSTRUMENTS • EQUIPMENT • BLUE PRINT PAPERS • KINDRED SENSITIZED PRODUCTS

POST

NATIONWIDE NETWORK OF POST DEALERS

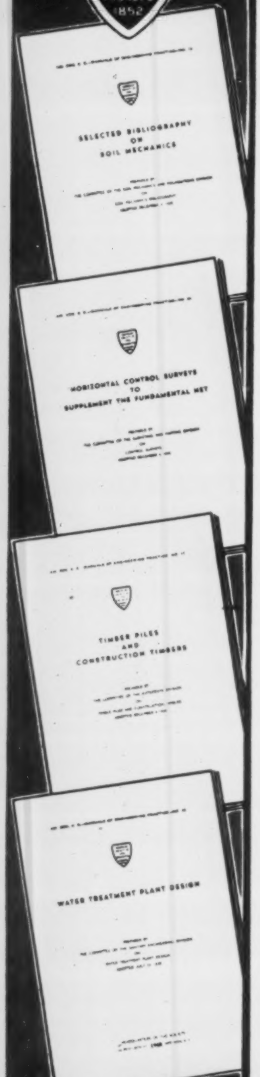
Atlanta—Georgia Blue Print Co.
Birmingham—James A. Head, Inc.
Boston—Boston Blue Print Co.
Buffalo—Buffalo Blue Print Co
Chicago—Frederick Post Co.
Cincinnati—Queen City Blue Print Co.
Cleveland—The City Blue Printing Co.
Columbus—Franklin Blue Print & Supply Co.
Dallas—The Rush Co.
Dayton—Gem City Blue Print & Supply Co.
Denver—W. H. Kistler Stationery Co.
Detroit—Frederick Post Co.
Fort Wayne—Fort Wayne Blue Print & Supply Co.
Fort Worth—Majestic Reproduction Co.
Houston—Texas Br. Frederick Post Co.
Indianapolis—Indianapolis Blue Print & Litho Co.
Jacksonville—A. R. Cogswell
Kansas City—Western Blue Print Co.
Knoxville—Schorn & Kennedy
Los Angeles—Stationers' Corp.
Memphis—Wray Williams Blue Print Co.
Milwaukee—Frederick Post Co. of Wis.
New Orleans—Southern Blue Print Co.
New York—John R. Cassell Co.
Oklahoma City—The A & E Equipment Co.
Omaha—Standard Blue Print Co.
Philadelphia—Philadelphia Blue Print Co.
Pittsburgh—American Blue Printing Co.
Portland—J. K. Gill Co.
St. Louis—Service Blue Print & Photo Copy Co.
Salt Lake City—Salt Lake Blue Print & Supply Co.
Seattle—Kuker-Ranken, Inc.
Tampa—Office Equipment Company
Toledo—Toledo Blue Print & Paper Co.
Tulsa—Triangle Blue Print & Supply Co.
Washington, D. C.—R. E. MacMichael
Wichita—City Blue Print Co.

JUST PHONE OR WRITE YOUR NEAREST POST MAN

MANUALS
of ENGINEERING PRACTICE

AMERICAN SOCIETY OF CIVIL ENGINEERS FOUNDED 1852

1. Code of Practice	$ .20
2. Terms Used in Sewage Disposal Practice	.40
3. Lock Valves	1.00
4. Selected Bibliography on Construction Methods	1.00
5 and 6. Charges and Method of Making Charges for Professional Services, each .50, both.	1.00
7. Government Services	.50
8. Engineering and Contracting Procedure for Foundations	.40
9. Steel Building Erection	.40
10. Technical Procedure for City Surveys	1.90
11. Letter Symbols and Glossary for Hydraulics	.60
12. Construction Plant and Methods for Flood Control	1.00
13. Filtering Materials for Sewage Treatment Plants	.60
14. Location of Underground Utilities	.40
15. Surveying Terms	.40
16. Land Subdivision	1.20
17. Timber Piles and Construction Timbers	.70
18. Selected Bibliography on Soil Mechanics	1.00
19. Water Treatment Plant Design	1.90
20. Horizontal Control Surveys to Supplement the Fundamental Net	.90
21. Standards of Professional Relations and Conduct	.50
22. Soils Mechanics Nomenclature	.40
23. Military Roads in Forward Areas	1.40
24. Surveys of Highway Engineering Positions and Salaries	1.30


SELECTED BIBLIOGRAPHY ON SOIL MECHANICS
HORIZONTAL CONTROL SURVEYS TO SUPPLEMENT THE FUNDAMENTAL NET
TIMBER PILES AND CONSTRUCTION TIMBERS
WATER TREATMENT PLANT DESIGN

TEAR THIS AD OUT AND CHECK THE LIST FOR YOUR COPIES

A discount of 50% from the above prices is allowed ASCE members of the

AMERICAN SOCIETY OF CIVIL ENGINEERS
33 W. 39th St., New York, N. Y.

INDEX OF PRODUCTS

Continued from page 28

OXYGEN
Air Reduction Sales Co.

PAINTS
Barrett Division, Allied Chemical & Dye Corp.

PAINT PIGMENT, ALUMINUM
Aluminum Co. of America

PAPER, DRAWING AND TRACING
Keuffel & Esser Co.

PAVING MATERIALS
Barrett Division, Allied Chemical & Dye Corp.
Lone Star Cement Corp.

PENSTOCKS
Bethlehem Steel Co.
Lock Joint Pipe Co.

PILES, CONCRETE
MacArthur Concrete Pile Corp.
Raymond Concrete Pile Co.
Union Metal Manufacturing Co.

PILES, CREOSOTED
American Creosoting Co.

PILES, STEEL BEARING
Bethlehem Steel Co.

PILES, STEEL SHELL
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.
Union Metal Manufacturing Co.

PILING, STEEL SHEET
Bethlehem Steel Co.
Union Metal Manufacturing Co.

PIPE, ASBESTOS-CEMENT
Johns-Manville Corp.

PIPE, CAST IRON
Cast Iron Pipe Research Assn.
U. S. Pipe & Foundry Co.

PIPE, REINFORCED CONCRETE
Lock Joint Pipe Co.

PIPE FITTINGS, CAST IRON
Cast Iron Pipe Research Assn.
U. S. Pipe & Foundry Co.

PIPE WRAPPING, ASBESTOS FELT
Johns-Manville Corp.

PLASTIC, ASPHALT
Philip Carey Mfg. Co.

POLES, CREOSOTED
American Creosoting Co.

PORTLAND CEMENT
Lone Star Cement Corp.

PORTLAND CEMENT, HIGH-EARLY-STRENGTH
Lone Star Cement Corp.

PUMPS
Layne & Bowler, Inc.

REGULATORS, OXYACETYLENE
Air Reduction Sales Co.

ROAD OILS
Barrett Division, Allied Chemical & Dye Corp.

ROAD SURFACING MATERIALS
Barrett Division, Allied Chemical & Dye Corp.

ROOFING MATERIALS
Barrett Division, Allied Chemical & Dye Corp.
Philip Carey Mfg. Co.
Johns-Manville Corp.

ROPE, WIRE
Bethlehem Steel Co.

SEWER PIPE, REINFORCED CONCRETE
Lock Joint Pipe Co.

SHEETS, ALUMINUM
Aluminum Co. of America

SHEETS, ASBESTOS-CEMENT
Johns-Manville Corp.

SHEETS, IRON & STEEL
Bethlehem Steel Co.

SHORING
Spencer, White & Prentis, Inc.

SILICA REMOVAL EQUIPMENT
Permutit Co.

STACKS
Bethlehem Steel Co.

STATIC CONTROL EQUIPMENT
West Dodd Lightning Conductor Corp.

STEEL, STRUCTURAL
Bethlehem Steel Co.

STORM SEWERS, CORRUGATED IRON
Armco Drainage Products Assn.

SUBAQUEOUS INTAKES AND OUTFALLS, REINFORCED CONCRETE
Lock Joint Pipe Co.

SURVEYING INSTRUMENTS
American Paulin System
Buff and Buff Co.
Keuffel & Esser Co.

SWIMMING POOL PURIFICATION AND RECIRCULATION EQUIPMENT
Permutit Co.

TANKS
Bethlehem Steel Co.

TAR
Barrett Division, Allied Chemical & Dye Corp.

TERMITE SHIELDS
Timber Engineering Co.

TIES, CREOSOTED
American Creosoting Co.

TIMBER, CREOSOTED
American Creosoting Co.

TIMBER JOINT CONNECTORS
Timber Engineering Co.

TORCHES, WELDING AND CUTTING
Air Reduction Sales Co.

TOWERS, STEEL
Bethlehem Steel Co.

TRACING DUPLICATIONS
Frederick Post Co.

TRACK, INDUSTRIAL AND PORTABLE
Bethlehem Steel Co.

TRANSITS
Buff & Buff Co.
Keuffel & Esser Co.

UNDERPINNING
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

VALVES, MULTIPORT, PILOT, AUTOMATIC DESLUDGING
Permutit Co.

WATER CONTROLLERS AND INDICATORS
Permutit Co.

WATER, DEALKALIZATION
Permutit Co.

WATER, DEMINERALIZING (REMOVAL OF TOTAL SOLIDS)
Permutit Co.

WATER FILTERS
Permutit Co.

WATER, FLUORIDE REMOVAL FROM
Permutit Co.

WATER, NEUTRALIZATION, CONTROL OF pH
Permutit Co.

WATERPROOFING MATERIALS
Barrett Division, Allied Chemical & Die Corp.

WATERPROOFINGS, MEMBRANE
Philip Carey Mfg. Co.

WATER SOFTENERS, ZEOLITE, PRESSURE AND GRAVITY, HYDROGEN ZEOLITE, HOT AND COLD LIME SODA, COLD LIME (SPAULDING PRECIPITATOR AND SPIRACTOR)
Permutit Co.

WATER SUPPLY EQUIPMENT
Layne & Bowler, Inc.

WATER SUPPLY PIPE REINFORCED CONCRETE
Lock Joint Pipe Co.

WELDING AND CUTTING APPARATUS
Air Reduction Sales Co.

WELDING MACHINES, ELECTRIC ARC
Lincoln Electric Co.

WELDING RODS AND WIRE
Lincoln Electric Co.

WELL WATER SYSTEMS
Layne & Bowler, Inc.

WIRE ROPE AND STRANDS
Bethlehem Steel Co.

WOOD PRESERVATIVES
Barrett Division, Allied Chemical & Dye Corp.

Alphabetical Index to Advertisers shown on page 32

The Society reserves the privilege of rejecting advertisements inconsistent with its ethical procedure

Permutit* water conditioning
equipment at
BAER FIELD AIR BASE

The water supply at the Air Corps' Baer Field, Fort Wayne, Indiana, comes from private wells. Before treatment it contains 24 grains of hardness per gallon and a considerable amount of iron.

These impurities make a water supply that is well below Army standards. So Permutit equipment was installed to condition the water. Three Permutit zeolite water softeners (shown at right side of photograph) reduce the hardness. These units are completely automatic. Iron is removed by four Permutit single-valve filters (at left of photograph).

The Permutit-treated water flows to service, soft, clear and iron free.

Let Permutit's free advisory service help solve your water problem

Permutit's field engineers will be glad to call upon you or your consultants and help work out your own water problem. Write for free booklets: The Permutit Company, Dept. A14, 330 W. 42nd St., New York, N. Y.

In Canada: Permutit Company of Canada, Ltd. . . . Montreal . . . Toronto . . . Winnipeg . . . Calgary.

*Trademark Reg. U. S. Pat. Off.

PERMUTIT WATER CONDITIONING HEADQUARTERS

BUFF
TRADE MARK TRADE MARK

WORLD FAMOUS FOR 74 YEARS

Transits and Levels for Civil and Mining Engineers

Buff precision and design are continuously in the forefront.

ENGINEERS and contractors know that BUFF performance is accurate and sure—with adjustments that hold permanently.

THE BUFF "X" TELESCOPE

has the finest and highest definition and simplest lens system. It is useful when the light is dim.

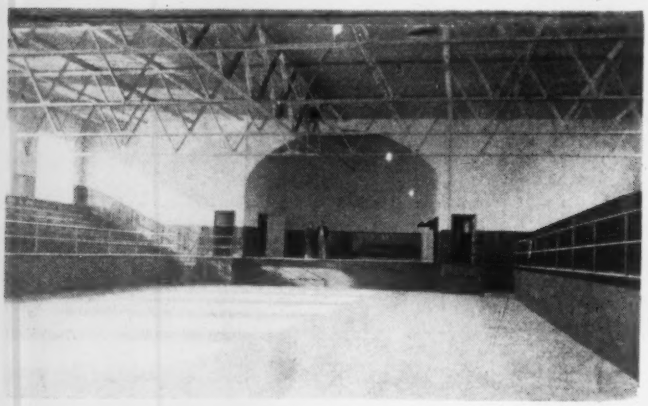
Buff is used almost exclusively on the largest works in this country and Canada and Mexico and So. America.

Astronomical lens experts.
All makes—intelligently repaired and regraduated by Factory Experts.

The finest work at the LOWEST POSSIBLE COST. Reliability and guaranteed work. A special Souvenir Plumb Bob sent gratis to graduate Civil Engineers.

THE Greatest ACCURACY
THE Hardest BRONZE
THE Simplest DESIGN

Buff & Buff Company
Jamaica Plain, Massachusetts



★ NATIONAL GUARD ARMORY
insulated with Carey ROCK WOOL

In planning the modern and efficient National Guard Armory at Maryville, Tennessee, the architects, Fred Manley Associates, Knoxville, Tenn., specified installation of Carey Rock Wool above the ceilings, about two carloads of this product being used for the purpose. Carey Rock Wool was selected for this job because of its known efficiency and dependability.

Tests by Mellon Institute of Industrial Research and other responsible organizations certify to the high quality of Carey Rock Wool. You insure maximum desirable results when you specify CAREY Insulations. Address Dept. 81 for details.

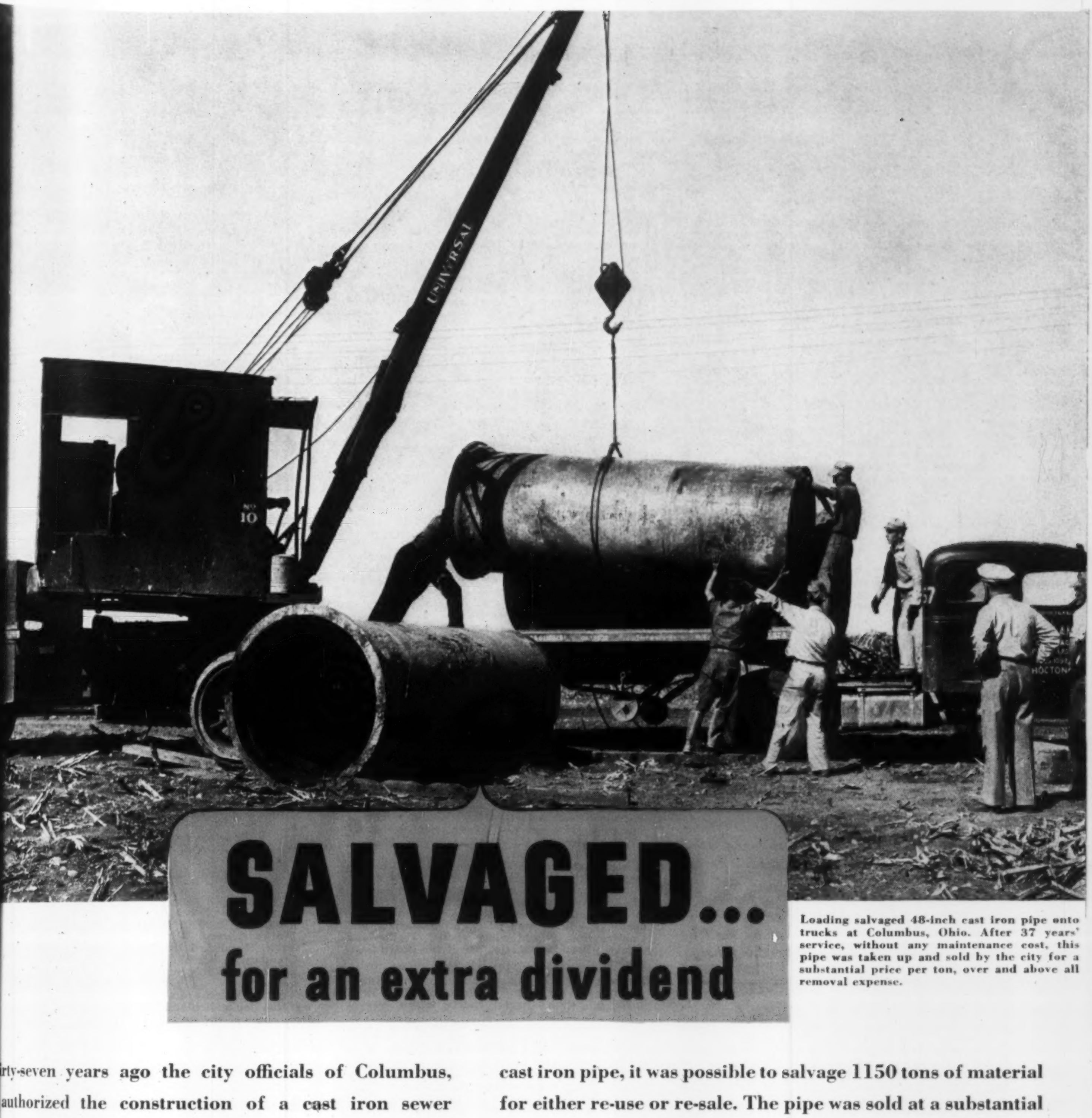
★ **The PHILIP CAREY Mfg. Co.**
DEPENDABLE PRODUCTS SINCE 1873
LOCKLAND, CINCINNATI, OHIO
In Canada: The Philip Carey Company, Ltd.
Office and Factory: Lennoxville, P. Q.

INDEX TO ADVERTISERS

ALPHABETICAL

AIR REDUCTION SALES COMPANY 6
ALUMINUM COMPANY OF AMERICA . . . *Back Cover*
AMERICAN CREOSOTING COMPANY 15
AMERICAN PAULIN SYSTEM 22
ARMCO DRAINAGE PRODUCTS ASSOCIATION . . . 17
BARRETT DIVISION, ALLIED CHEMICAL & DYE CORPORATION 19
BETHLEHEM STEEL COMPANY 21
BUFF AND BUFF COMPANY 32
PHILIP CAREY MANUFACTURING COMPANY . . . 32
CAST IRON PIPE RESEARCH ASSOCIATION 13
ENTERPRISE GALVANIZING COMPANY 27
INTERNATIONAL NICKEL COMPANY, INC. 1
JOHNS-MANVILLE CORPORATION . . . . . . 2 and 3
KEUFFEL & ESSER CO. 4
LAYNE & BOWLER, INC. 20
LINCOLN ELECTRIC COMPANY . . . . . . *Third Cover*
LOCK JOINT PIPE COMPANY 8
LONE STAR CEMENT CORPORATION 12
MACARTHUR CONCRETE PILE CORPORATION . . 10
PERMUTIT COMPANY 31
FREDERICK POST COMPANY 29
RAYMOND CONCRETE PILE COMPANY . *Second Cover*
SPENCER, WHITE & PRENTIS, INC. 27
TIMBER ENGINEERING COMPANY 5
UNION METAL MANUFACTURING COMPANY . . . 7
U. S. PIPE & FOUNDRY COMPANY 23
WEST DODD LIGHTNING CONDUCTOR CORPORATION 25

Index to Products Shown on Pages 28 and 30



SALVAGED...
for an extra dividend

Loading salvaged 48-inch cast iron pipe onto trucks at Columbus, Ohio. After 37 years' service, without any maintenance cost, this pipe was taken up and sold by the city for a substantial price per ton, over and above all removal expense.

irty-seven years ago the city officials of Columbus, authorized the construction of a cast iron sewer main more than a mile long and 4 feet in diameter. that time, 160 billion gallons had been pumped h this cast iron line without one cent of maintenance n the pipe.

ecently the city completed a new sewage treatment and large intercepting sewer, making the old unnecessary for further duty. Since it was cast iron pipe, it was possible to salvage 1150 tons of material for either re-use or re-sale. The pipe was sold at a substantial price per ton, representing *an extra-dividend to the taxpayers* of Columbus.

It is impossible to foretell future requirements or population shifts in metropolitan cities but any public official can be sure that, when water or sewer mains must be abandoned or rerouted, the pipe can be salvaged or re-used, *if it is cast iron pipe.*

Pipe bearing this mark is cast iron pipe. TRADE MARK REG. **Available in diameters from 1¼ to 84 inches.**

RON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1015 PEOPLES GAS BUILDING, CHICAGO, ILLINOIS

AST IRON PIPE

PUBLIC TAX SAVER NO. 1

Designer, mechanical or civil engineer, to supervise draftsmen and layout for fabricated structural steel plant. Salary, $5,000 a year. Location, New York, N.Y. W-322.

Instructor for civil engineering department. Should be able to teach photogrammetry and surveying or handle the mechanics of materials and hydraulic laboratory work. Permanent. Salaries: Instructor, $2,100–$2,800 a year; Assistant Professor, $3,000 a year. W-336.

Instructor and Associate Professor (*a*) Assistant or Associate Professor in civil engineering. Major will be in fluid mechanics, sanitary and water supply engineering. Will also teach basic courses such as mechanics, surveying, strength of materials. Prefer M.S. degree. Practical experience desirable. Salary, $2,900–$3,200 a year for 10 months service. (*b*) Instructor in Civil Engineering. Will teach highways, soil mechanics. M.S. degree desirable. Salary, $2,200–$2,400 a year for 10 months' service. Location, East. W-360.

Structural Designer, Concrete Designer, and Field Engineer. Salaries, $3,600–$4,800 a year. Location, Louisiana. W-445.

Civil Engineers, with about 10 years' broad and progressive professional civil and sanitary engineering experience, including several years in utilities (water distribution, sewerage, storm drainage and, if possible, gas distribution), highway and general design and construction. Work will be in connection with the site improvements and utilities in the areas outside the buildings. Some traveling. Salary, $3,200–$3,800 a year. Location, Washington, D.C. W-490.

Sales Engineer, 35–42, to sell steel sheet-piling and represent company among leading contracting and engineering firms. Should have certain engineering knowledge and good personality. Permanent. Salary, $2,750 a year, plus expenses. Location, New York, N.Y. W-500.

Graduate Civil Engineers, 25–30, with about 2 or 3 years' experience in concrete construction to act as assistant superintendents for subcontractor. Must be able to take charge and handle men. Salary open. Considerable traveling. Headquarters, New York, N.Y. W-515.

Estimator, about 45, to take off quantities on reinforced concrete tanks and elevating machinery. Permanent. Salary, $4,160 a year. Location, New York, N.Y. W-516.

Purchasing Engineer for large shipyard construction job. Should have some experience purchasing building materials and supplies, piping, etc. Salary open. Duration, about one year. Location, Delaware. W-522.

Structural Steel Designer (*a*) capable of analyzing stresses in cable supporting structures; knowledge of mechanical design and equipment desirable. Salary open. Location, Connecticut. W-526.

Instructor for civil engineering department. Will teach surveying courses, including plans and topographic surveying, route surveying, brief treatment of astronomy and astronomical observations, curves and earthwork and topographic drawing. Ability to teach hydraulics desirable. Salary open. Location, New England. W-540.

Superintendent experienced on dock construction—that is, piles, timber. Salary, $5,200 a year. Temporary. Location, New York, N.Y. W-542.

Inspectors (*a*) Principal Inspector to take charge of inspection work for construction of plant. Preferably graduate civil engineer with 10 years' construction experience (3 on industrial buildings). Salary, $3,200 a year for 40-hour week. (*b*) Senior Inspectors to perform inspection work under general supervision for construction of plant. Should have 5 years' construction experience (3 on reinforced concrete, structural steel, mechanical, and/or road construction). Salary, $2,600 for 40-hour week. (*c*) Junior Inspectors for inspection work under immediate supervision on construction of plant. Should have had 2 years' construction experience including experience on reinforced concrete, structural steel, mechanical work, and/or road construction. Salary, $2,000 for 40-hour week. Duration, about 6 months. Location, New York State. W-552.

Construction Engineer who has had a good background in the mechanical trades to coordinate the work of the respective superintendents on a large construction project. Company prefers man with good practical experience. Location, foreign. W-553.

Assistant Professor, civil engineer, to teach course in surveying practice. Prefer man in early thirties. Must have Master's degree. Permanent. Salary, $2,500 a year. Location, West. W-593.

Office Engineer experienced in construction of industrial buildings, to estimate, take off quantities, order materials, and do minor drafting. About one year's work. Salary, $4,160 a year. Location, Virginia. W-606.

Structural Designer and Structural Draftsman. Should be experienced in mill building construction. Salary, $3,120 a year plus overtime. Location, New York, N.Y. W-661.

Construction Expediter. Must know construction progress. Will be responsible for material supply. Must be able to keep materials ahead of job. Also need assistants to aid in the office and field work of above. Salary, $2,600–$3,900 a year. Location, South. W-682.

Civil Engineers qualified to supervise survey and topographical work and to make soil boring tests and load tests. Should have had experience in heavy industrial construction including foundations, buildings, and alinement of heavy equipment. Location, northern South America. W-687.

Recent Graduate in Civil or Mechanical Engineering, as instructor in hydraulics, heat power, and materials testing laboratories. Salary, $1,900–$2,200 a year beginning September 1. Location, South. W-688.

Water-Works Engineer. Should have some previous experience on water-works construction, pipe lines, reservoir construction, valuation and appraisal of water companies and properties. Salary, about $3,000 a year. Location, New York, N.Y. W-693.

Office Engineer, mechanical or civil, preferably with some shipyard experience, to plan and expedite work and materials. Will act as assistant to General Manager of shipyards. Salary, $3,600–$4,800 a year. Location, East. W-694.

RECENT BOOKS

New books of interest to Civil Engineers donated by the publishers and filed in the Engineering Societies Library, or in the Society's Reading Room, will be found listed here. The notes regarding the books are taken from the books themselves and are edited by members of the staff of the Society or of the Library. Those books which are in the Library may be borrowed by mail by Society members for a small handling charge.

Alloy Constructional Steels. By H. J. French and F. L. Laque. American Society for Metals, Cleveland (Ohio), 1942. 294 pp., illus., charts, tables, $9\frac{1}{2} \times 6$ in., cloth, $4.

Based on a series of lectures, this discussion of the utilization of alloys in constructional steels illustrates the importance of the alloy steels and is also intended to provide help in the selection of steels for different classes of service. Following a general survey of the subject of alloy steels, both unhardened and heat-treated, the author covers service at sub-atmospheric and elevated temperatures, wear, corrosion, and special treatments. The methods of identification of S.A.E. and A.I.S.C. steels are explained.

Annotated Geological Bibliography of Virginia. (University of Virginia Bibliographical Series No. 2.) By J. K. Roberts, published by the Alderman Library, Charlottesville, Va. (The Dietz Press, Richmond, Va.), 1942. 726 pp., tables, 9 × 6 in., paper, $5.

This valuable bibliography provides an exhaustive record containing over 2,500 publications, all competently abstracted. All fields of geology except soils and climate are included, and the record extends from the earliest writings to the end of 1940. The arrangement is by author, with a subject index. An introduction on the rise and development of geological thought in Virginia is included.

Engineering Drawing and Mechanism. (Rochester Technical Series.) By H. J. Brodie. Harper & Brothers, New York and London, 1942. 241 pp., diagrs., charts, tables, 11 × 9 in., cloth, $2.25.

This textbook is one of a series in a program for developing practical teaching materials which will be closely related to the actual requirements of various jobs in industry. The two sections of the book provide a sound foundation in the general phases of mechanical drawing and in the drafting of cams, gears, and mechanisms.

Highway Research Board, Proceedings of the Twentieth Annual Meeting, held at Washington, D.C., Dec. 3–6, 1940, edited by R. W. Crum. National Research Council, Division of Engineering and Industrial Research, Washington, D.C. 883 pp., illus., diagrs., tables, $10 \times 6\frac{1}{2}$ in., cloth, $3.25.

Some sixty technical papers and reports presented at the 1940 annual meeting of the Highway Research Board are published in this volume. The comprehensive scope of the Board is reflected in the separate titles which are grouped under the headings: Economics, Design, Materials and Construction, Maintenance, Soils, Traffic and Safety. Brief information about the Board is included.

Mechanics of Fluids. By G. Murphy. International Textbook Co., Scranton, Pa., 1942. 329 pp., illus., diagrs., charts, tables, $8\frac{1}{2} \times 5$ in., fabrikoid, $3.25.

In this introductory textbook on the behavior of fluids, the approach and techniques are those that have proved successful in the mechanics of solids. The basic method of analysis is that of the free-body, used in conjunction with the fundamental principles of mechanics, expressed in Newton's laws of motion. Numerous practical applications of the theory are cited, and numerical and laboratory problems are provided.

(The) Municipal Year Book 1942. Edited by C. E. Ridley and O. F. Nolting. International City Managers' Association, 1313 East 60th St., Chicago. 685 pp., maps, charts, tables, $10 \times 6\frac{1}{2}$ in., cloth, $8.50.

The Year Book provides an accurate picture of municipal conditions each year, discussing new developments, trends, and the various activities, and providing much statistical information, directories of officials, etc. Maps showing all cities of over 5,000 population are included in the present issue, as is information upon metropolitan districts. Other new sections deal with city planning, city-owned parking lots, and wartime organization.

Practical Construction of Warships. By R. N. Newton. Longmans, Green & Co., London, New York, and Toronto, 1941. 318 pp., illus., diagrs., charts, tables, $10 \times 6\frac{1}{2}$ in., cloth, $6.

This textbook is based on courses at the Royal Naval Engineering College and the Royal Naval Dockyard, and replaces an older text by N. J. McDermaid, *Shipyard Practice as Applied to Warship Construction.* It deals with the principles of construction and erection of the structure and the more important ships' services of modern warships. Chapters on launching, docking and undocking, and on the prevention of corrosion are included.

Surveyors' Field-Note Forms, 2 ed. By C. E. Bardsley and E. W. Carlton. International Textbook Co., Scranton, Pa., 1942. 127 pp., diagrs., charts, tables, $7\frac{1}{2} \times 4\frac{1}{2}$ in., fabrikoid, $1.

This book offers a sample set of field notes for use with classroom lectures and a text on plane surveying, and is intended especially for students beginning that subject.

Table of Natural Logarithms, Vol. 4, Logarithms of the Decimal Numbers from 5.0000 to 10.0000. Prepared by the Federal Works Agency, WPA for the City of New York. Published by the National Bureau of Standards, Washington, (D.C.) 1941. 506 pp., tables, 11 × 8 in., cloth, $2 (payable in advance).

This last volume of a series of four contains the sixteen decimal place values of the natural logarithms of the decimal numbers from 5 to 10 at intervals of 0.0001. The previous three volumes contained the sixteen decimal place values of the natural logarithms of the decimal numbers from 0 to 5 at intervals of 0.0001 and of the integers from 1 to 100,000.

Tables of the Moment of Inertia and Section Modulus of Ordinary Angles, Channels, and Bulb Angles with Certain Plate Combinations, prepared by the Work Projects Administration for the City of New York, as a report of Official Project No. 165-2-97-22, Mathematical Tables Project; conducted under the sponsorship and for sale by the National Bureau of Standards, Washington, D.C., 1941. 197 pp., tables, $10\frac{1}{2} \times 8$ in., cloth, $1.25 (payable in advance).

This new volume in the series of mathematical tables sponsored by the U.S. Bureau of Standards presents tables of the moment of inertia and section modulus of ordinary angles, channels, and bulb angles with certain plate combinations. Tables of various dimensional properties of these structural shapes are appended.

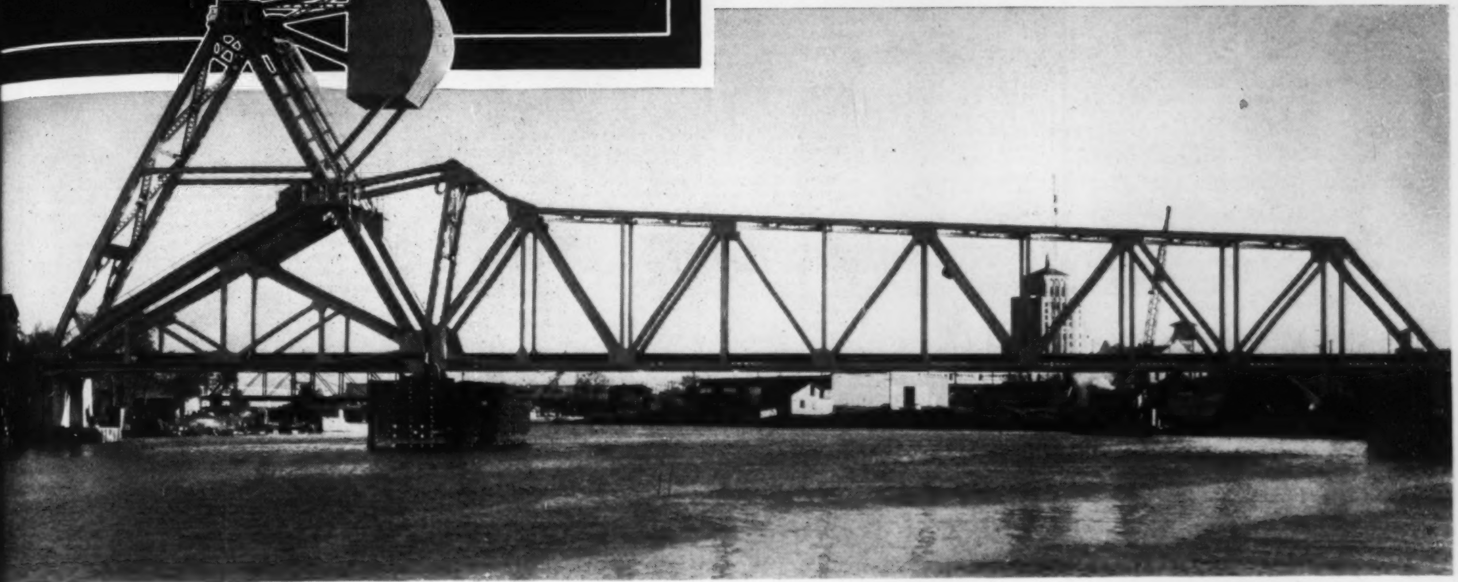
Uniformity in Highway Traffic Control. By W. P. Eno. The Eno Foundation for Highway Traffic Control, Saugatuck (Conn.), 1941. 83 pp., diagrs., illus., 7 × 5 in., paper, $1.

The basic principles of traffic control as developed by the author during the last forty years are summarized for general use. Topics covered include police enforcement, licensing, traffic aids, pedestrian rules, parking, one-way traffic, and noise reduction. The necessity for uniformity is stressed.

PUBLIC TAX SAVER NO. 1

CONNECTING LINKS THAT HELP TO CLEAR THE WAY

for faster war transportation



THE ACCELERATING TEMPO OF WAR TRAFFIC over America's highways, railroads and waterways has placed new importance on bridges as expediters of rapid movement. These two bridges typify the strategic roles now played by many spans constructed by American Bridge Company. Though completed recently, in their short terms of service they have made an inestimable contribution to the war effort by speeding and integrating traffic over key routes.

THE 322-FOOT BASCULE BRIDGE, shown directly above, is an important link in a rail network serving industrial Texas. It exemplifies the kind of engineering skill that must go into bridges in these critical days. The center pier of the former swing span split the Neches River into two narrow channels. Increased river traffic brought an insistent demand for a single navigation channel at least 200 feet wide. The new bridge accomplished this successfully. It was erected and the old span dismantled without disrupting train movements, except for an 11-hour interval. Now, rail traffic moves faster because the bridge can be raised and lowered in a fraction of the time required to operate the old swing span. And river traffic conditions are greatly improved by the wider channel.

WAR TRANSPORT IS SPEEDIER to east coast shipping points because of the new 2004-foot Passaic River lift-span bridge, shown at the top. Delays to the movement of motor traffic on a N. J. highway are greatly reduced. The high-level lift span, having a vertical clearance of 40 feet when closed, requires only a fifth as many openings as were formerly necessitated by the old low-level drawbridge, and openings require less time. This bridge was chosen by the American Institute of Steel Construction as the most outstanding in the movable-bridge group opened to traffic in 1941.

IT MEANS MUCH TO US to know that hundreds of American Bridge-built spans throughout the country are helping to clear the way for faster war transportation. Today, and until Victory is won, our entire resources of equipment, engineering talent, and specialized "know how" are pledged to projects directly essential to the war.

AMERICAN BRIDGE COMPANY

General Offices, Frick Building, Pittsburgh, Pa.

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit · Duluth
Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

CURRENT PERIODICAL LITERATURE

Abstracts of Articles on Civil Engineering Subjects from Publications (Except Those of the American Society of Civil Engineers) in this Country and Foreign Lands

Selected items for the current Civil Engineering Group of the Engineering Index Service, 29 West 39th Street, New York, N.Y. Every article indexed is on file in The Engineering Societies Library, one of the leading technical libraries of the world. Some 2,000 technical publications from 40 countries in 20 languages are received by the Library and are read, abstracted, and indexed by trained engineers. With the information given in the items which follow, you may obtain the article from your own file, from your local library, direct from the publisher, or they may be borrowed from the Engineering Societies Library. Photoprints will be supplied by this library at the cost of reproduction, 25 cents per page to members of the Founder Societies (30 cents to all others), plus postage, or technical translations of the complete text may be obtained at cost.

BRIDGES

Bascule, Maintenance and Repair. Dislocated Bascule Rocked into Position, S. J. Michuda. *Eng. News-Rec.*, vol. 128, no. 15, Apr. 9, 1942, pp. 557–559. Trunnions of 1,750-ton leaf of 106th Street bascule bridge in Chicago were knocked loose from their bases by wind when leaf was in open position; city bridge engineers devised ingenious scheme of rocking span by use of hydraulic and asphalt jacks which lifted all weight off trunnions during shifting operations.

Concrete Arch, Forms. Falsework for Arches Set on Drum Gates. *Eng. News-Rec.*, vol. 128, no. 15, Apr. 9, 1942, pp. 552–553. Falsework constructed on narrow spillway crest of Grand Coulee Dam to support forms for reinforced concrete highway bridge across top of spillway; at top of bents 38-ft timber cap has its ends supported on brackets to carry overhang outside bent 21 ft wide.

Failure. Long Girder Span Bridge Collapses During Erection. *Eng. & Contract. Rec.*, vol. 55, no. 2, Jan. 14, 1942, pp. 16–17 and 19. Account of failure of bridge under construction at Hartford, Conn.; two 96-ft girders had already been cantilevered out from falsework bent and traveler was about 85 ft out when accident occurred; suggestion made that movement of river bottom may have shifted piling; illustrations and additional construction details that may support theory given.

Highway, Blast Plate Protection. Protecting Bridge on Queen Elizabeth Way, A. Sedgwick. *Roads & Bridges*, vol. 80, no. 1, Jan. 1942, pp. 28–30. Description of installation and effectiveness of steel plates placed on all bridges over railways on Canadian superhighway; at all five crossings bridges are being protected underneath by means of line of Armco blast plates extending longitudinally over each track; thick bituminous coating is securely bonded to metal by means of embedded asbestos fibers, thus giving protection against cinder blast from locomotive stacks and sulfurous gases.

Highway, Ontario. Bridge Features on Dual Highway from Highland Creek to Oshawa, V. S. Murray. *Roads & Bridges*, vol. 80, no. 2, Feb. 1942, pp. 26–29 and 106. Description of eighteen bridges of which four are stream crossings; three are overpasses; majority of structures are of rigid-frame type, and four underpasses yet to be built are to be single-span rigid-frame type; illustrations and dimensions given.

Highway, Strengthening. Strengthening Our Highway Bridges, E. L. Pavlo. *Eng. News-Rec.*, vol. 128, no. 9, Feb. 26, 1942, pp. 339–342. Method of strengthening existing steel highway bridges by integrating concrete roadway slab with steel floor system is described; application of design is carried out step by step for typical example.

Movable, Panama Canal Zone. Bridge Joins Continents at Panama Canal. *Eng. News-Rec.*, vol. 128, no. 9, Feb. 26, 1942, pp. 348–349. Two bobtail-swing spans are being built over Miraflores locks of Panama Canal, providing first rail and highway connections between continents of North and South America; each span consists of long and short arm, 184 and 92 ft long, respectively; operation of bridges will be coordinated with lock operations.

Piers, Protection. Bridge Piers Encased Against Scour, H. L. Broadfoot and W. A. Chalkley. *Eng. News-Rec.*, vol. 128, no. 15, Apr. 9, 1942, pp. 562–564. At Kentucky Dam on Tennessee River it was necessary to encase concrete footings and timber pile foundations of I.C.R.R. bridge below dam with circular cells of steel sheet-piling driven through river bed overburden to rock to prevent possible scour from concentrated flow of river diversion.

Railroad, New Zealand. Railway Bridges of Reinforced Concrete. *Commonwealth Engr.*, vol. 29, no. 8, Mar. 2, 1942, pp. 193–202. Design and construction of several types of bridges, located on three links of New Zealand railway system, described.

Railroad, Quebec. Bridge of Radical Design Erected in Record Time. *Eng. & Contract. Rec.*, vol. 55, no. 2, Jan. 14, 1942, pp. 10–11. C.N.R. bridge engineers develop unique two-girder design that saves 350,000 lb of steel for war purposes; erection over Trans-Island Boulevard at Dorval, Quebec, completed in 6 hours, with train schedules uninterrupted.

Railroad, Quebec. C.N.R. Saves Steel for War Use on Large Grade-Separation Span, E. Eriksen. *Roads & Bridges*, vol. 80, no. 1, Jan. 1942, pp. 19–23 and 70. Illustrated description of Canadian National Railways structure which features concrete deck without ties on ballast, producing economical plate girder bridge; unit is 800-ton double-track span which forms overpass over Montreal-Ste. Anne de Beaupré section of Trans-Island Highway.

Railroad. Restores Bridge to Service after 25 Years. *Ry. Eng. & Maintenance*, vol. 38, no. 5, May 1942, pp. 343–344. How Georgia Railroad strengthened old 150-ft combination iron and wood truss span, long supported on timber trestle false work.

BUILDINGS

Denver, Colo. Combined Hangar and Office Building. *Eng. News-Rec.*, vol. 128, no. 11, Mar. 12, 1942, pp. 402–403. To reduce cost and to save materials, offices, shops, and hangar space for two airlines at Denver airport have been combined in one structure; use of both steel frame and reinforced concrete construction provided most satisfactory type of building; unusual feature is heating system for removing ice and snow at base of large hangar door.

Garages, Underground. Underground Garage Building. *Western Construction News*, vol. 17, no. 2, Feb. 1942, pp. 60–64. Block-large, four-story, flat-slab structure to utilize subsurface area in Union Square, San Francisco, as means of aiding parking problem in shopping district; adjacent streets temporarily supported by steel piles and timber sheathing; building is 412 by 275 ft; lower floor is $45^1/_2$ ft below ground surface; roof protection; bulkhead system; wales and sheathing; forms; concreting; stripping and curing.

Underpinning. Underpinning Methods—Sydney Morning Herald Building, H. R. Smith. *Commonwealth Engr.*, vol. 29, no. 7, Feb. 2, 1942, pp. 180–182. Illustrated description of principal details of engineering work entailed in construction of new machine room beneath building; accommodations became necessary when it was decided to alter size of newspaper and to install new printing presses for purpose.

Warehouses, Construction. Substantial Service Roads Speed Army Base Construction. *Eng. News-Rec.*, vol. 128, no. 19, May 7, 1942, pp. 768–771. Methods outlined which made possible unusually rapid construction of 180 × 602-ft warehouses which are principal units of depot comprising Quartermaster base; walls and floor are concrete and roofs are timber carried on timber trusses supported on walls and concrete columns; concrete service roads were constructed prior to beginning of work on buildings making delivery of materials and subsequent haulage a major factor in speed of construction.

Warehouses, Design. Warehouses Designed to Speed Construction. *Eng. News-Rec.*, vol. 128, no. 17, Apr. 23, 1942, pp. 622–624. Concrete frame warehouse for military needs encloses 18 acres of storage space; bays are 20 × 40 ft with flat-slab concrete roof on which rain water will be impounded until it evaporates, thus eliminating need for disposal pumps; single monitor bay accommodates shop cranes over two railway tracks running full length of building.

CITY AND REGIONAL PLANNING

Great Britain. Town and Country Planning in 1941. *Surveyor*, vol. 101, no. 2616, Mar. 13, 1942, pp. 91–92. Brief review of outstanding papers and comments on post-war planning; proposed national authority; decentralization and redistribution problems.

CONCRETE

Cement Plants. Sliding Scaffolds Speed Cement Plant. *Eng. News-Rec.*, vol. 128, no. 13, Mar. 26, 1942, pp. 474–477. Two 100-ft traveling scaffolds, 50 ft high, served as form falsework and working platforms on construction of high arched-roof concrete building for storage of raw materials at Marquette Cement Company's new plant at Des Moines, Iowa; building 470 ft long and 65 ft high is concrete shell of unusual design and appearance.

Construction, Prefabricated. Combined Pre-cast and In-situ System of Construction, T. J. Bray. *Concrete & Constr. Eng.*, vol. 37, no. 3, Mar. 1942, pp. 100–102. Illustrated description of designs of "Pre-situ" system of construction, in which pre-cast concrete sections are subsequently molded together with in-situ concrete filling so that bolting and grouting are unnecessary; it is primarily intended for single-story dwellings but is claimed to be most advantageous in multiple-housing schemes.

Culverts. 20-ft Diameter Railway Culvert, S. C. Shome. *Concrete & Constr. Eng.*, vol. 37, no. 3, Mar. 1942, pp. 103–107. Details of design and construction of reinforced concrete culvert and embankment 106 ft high for Assam Bengal Railway; detail drawings are given. From *Indian Concrete J.*, Oct. 15, 1941.

Domes and Shells. Domed Building Fitted to Research Needs. *Eng. News-Rec.*, vol. 128, no. 15, Apr. 9, 1942, pp. 536–538. Structure to house 100,000,000-v cyclotron at University of California has been designed to meet unusual requirements; interior columns are eliminated by domed roof on stiffened ribs; stresses in ribs are reduced by polygonal steel tie at spring line; nearly circular plan makes it possible to use overhead crane that rotates about center; total weight of roof steel is 11 lb per sq ft.

Drydocks, United States. Navy Drydocks Make Construction History, *Eng. News-Rec.*, vol. 128, no. 13, Mar. 26, 1942, p. 472, supp. sheets. Brief description of drydock building program in United States; drawings, reproduced from book published for Spencer, White & Prentis, show steps in building drydocks entirely of tremie-placed concrete.

Expansion. Expansion of Concrete Due to Reaction Between Andesitic Aggregate and Cement, H. A. Coombs. *Am. J. Science*, vol. 240, no. 4, Apr. 1942, pp. 288–297. Recent work has shown that certain types of rock used as aggregate react chemically with high alkali cement; this reaction causes excessive expansion and in few cases ultimate failure of concrete; one of products of reaction filters through concrete and exudes on surface; possible means of detecting troublesome rocks involves use of ultra-violet light and selective staining methods. Bibliography.

Ready Mixed. Unitized Batching Speeds Production of Concrete for Big Ordnance Plant, W. E. Trauffer. *Pit & Quarry*, vol. 34, no. 9, Mar. 1942, pp. 109–110. Notes on equipment and practice of contractor on construction of St. Louis Small Arms Plant; ground was broken in February 1941; completion scheduled for March 1942; during peak demand, as many as 80 cars of sand and gravel were unloaded and used in day of three 8-hour shifts.

Roofs. Construction of Flat Roof Slabs, R. M. Thompson. *Concrete & Constr. Eng.*, vol. 37, no. 3, Mar. 1942, pp. 93–96. At munitions factory, pre-cast reinforced concrete slabs have been erected in lengths of 13 ft 4 in. to span between

THREE OFFERS AND A PROPOSAL

IMAGINEERING

★
SO MUCH SO SOON
★

FIRST OFFER: If you operate *any kind* of equipment made of aluminum and you are baffled in any way in maintaining it in top condition—give us the facts, and we will rush you our recommendations.

We are busy making more millions of pounds a month than we made in a whole year, not so long ago—but not too busy to make sure that no single pound of aluminum at work anywhere on war effort shall fail to do its share of making whatever it takes to win.

SECOND OFFER: If you are making anything whatsoever out of aluminum, and are stumped in any way in setting up the best methods of fabricating it—give us the facts, and we will see that you get all the know-how in our power.

THIRD OFFER: If you have joined the host of those who believe that industry must even now be planning the new products that will make jobs when this thing is finally over; if you are letting your imagination soar: Won't you ask us to help you engineer it down to earth with all the up-to-date facts about Alcoa Aluminum, plus some of the very practical dreams we have been dreaming?

AND THE PROPOSAL: Do some personal Imagineering, right now, for the sake of your own personal tomorrow.

We have been talking Imagineering for some months largely in terms of the future. And in terms of industry. But here is the personal slant:

Thirty billion dollars is loose in the country. It is the gap between what is available for spending and what is available for personal purchases. Each of us has a sliver of that chunk of excess purchasing power.

If we put it into War Bonds, we are told that it will both finance the war, and avoid inflation. We sometimes forget that it will also finance ourselves, as users of goods, to buy the new products we are all readying, as makers of goods. Buying tomorrow, today, is patriotism and sense—business sense.

Aluminum Company of America, 2127 Gulf Bldg., Pittsburgh, Pa.

ALCOA ALUMINUM

encased supporting steel beams, and have then been covered with in-situ concrete 4 in. thick so as to form flat roof 6 in. thick; method of casting slabs; arrangement of roof slab, and method of forming dowel holes shown in drawings.

Sewage Tanks. Conical Settling Tank, K. G. Griffiths. *Concrete & Constr. Eng.*, vol. 37, no. 1, Jan. 1942, pp. 4–11. Weight of conical shell and slurry is generally transferred to substructure through triangular fillet or ring beam, distance of which from apex of cone is determined by arrangement of substructure; this generally consists of four-to-eight columns, or of tower, either circular or square, built in reinforced concrete or brickwork; formulas presented to determine ring force and meridian force at any point of cone.

Shock-Resistant Design. Resistance of Reinforced Concrete Structures to Shock, P. Abeles. *Concrete & Constr. Eng.*, vol. 37, no. 1, Jan. 1942, pp. 16–27. It is concluded that in order to save unnecessarily high percentages of reinforcement, use of deformable concrete should be very suitable for war-time structures which are required to have separate protection against missiles; design can therefore be slender with slight reinforcement, thus ensuring great flexibility; capacity of shock absorption can be further increased by introduction of special resilient or compressible members at supports.

Water Tanks and Towers. Prestressed Concrete Water Tanks. *Eng. News-Rec.*, vol. 128, no. 17, Apr. 23, 1942, pp. 608–609. Construction procedure on two pre-stressed tanks—each with capacity of two million gallons—at Council Bluffs, Iowa.

CONSTRUCTION INDUSTRY

Airports, Yuma, Ariz. Equipment for Speed and Profit in Airport Construction, J. C. Coyle. *Pub. Works*, vol. 73, no. 4, Apr. 1942, pp. 25–26 and 35. Equipment used in clearing and grading 600-acre Yuma airport, and in paving runways, taxiway, and loading platform, illustrated and described.

Mexico. Construction Hits New High in Mexico, A. N. Carter. *Eng. News-Rec.*, vol. 128, no. 17, Apr. 23, 1942, pp. 610–614. Largest construction program ever planned by Mexico is now under way; facts and figures concerning irrigation work, public building, power projects, road construction, and water supply and sanitation developments.

DAMS

Concrete Arch, British Columbia. Dam for Canadian Paper Mill. *Western Construction News*, vol. 17, no. 3, Mar. 1942, pp. 99–101. Notes on construction of new dam is connection with hydroelectric development of Powell River Co. for its pulp and paper mill at Powell River, B.C.; variable radius arch concrete dam when completed will have maximum height from bedrock to crest of 205 ft, and total crest length will be 680 ft; concrete dropped 50 ft in river bed section.

Concrete, British Columbia. Construction of Scanlo Dam, W. Jamieson. *Eng. & Contract. Rec.*, vol. 55, no. 1, Jan. 7, 1942, pp. 10–12. Reinforced concrete structure, of variable radial arch design, replaces temporary log-crib dam on Lois River, British Columbia power development.

Concrete, Cutoff Wall. Asphalt Cutoff Wall at Claytor Dam, H. S. Slocum. *Eng. News-Rec.*, vol. 128, no. 13, Mar. 26, 1942, pp. 490–492. Cutoff wall of sand-asphalt mix was used at Claytor hydroelectric project near Radford, Va., to stop underflow through north abutment of dam; sheeted trench was sunk through overburden to rock, and after all solution channels had been cleaned out, trench and all rock channels were filled with hot sand-asphalt mix to above reservoir level.

Concrete Gravity, California. Cableway System of Distributing Concrete Found Ideal on Big Dam Project. *Concrete*, vol. 50, no. 2, Feb. 1942, pp. 2–4. Notes on construction of Shasta Dam of Central Valley Project; dam is designed for maximum height of 560 ft and length of 3,500 ft between abutments supported in rocky sides of Sacramento River valley; concrete mixing plant designed for production of 10,000 cu yd of concrete in day of 24 hours; details of cableway distributing system given.

Concrete Gravity, Washington. Grand Coulee Forms Columbia River Hydro, I. A. Winter and S. M. Denton. *Elec. World*, vol. 117, no. 12, Mar. 21, 1942, pp. 66–68. Largest structure ever built is 10,500,000-cu yd dam to develop 1,944,000 kw and irrigate more than million acres in state of Washington; ultimately structure will contain nine 108,000-kw generators in each of two plants at North dam, one at each end; only West plant has been built; generator data; equipment protection; switching and relaying.

India. Emerson Barrage, F. F. Haigh. *Instn. Civil Engrs.—J.*, vol. 17, no. 2, Dec. 1941, pp. 107–152, 2 supp. plates. Description of Emerson Dam at Trimmu on Chenab River; purpose of dam is to control waters of Chenab at this site, which vary in discharge from 900 to 650,000 cu ft per sec, and to permit their use up to maximum discharge of 7,750 cu ft per sec for irrigation in canals of Haveli project.

Mexico. Presa de Derivacion "Las Pilas" en Tehuantepec, Oax., L. Basich. *Irrigation en Mexico*, vol. 22, no. 4, July–Aug. 1941, pp. 287–294. Las Pilas derivation dam in Tehuantepec, State of Oaxaca, Mexico; dam forms part of Tehuantepec irrigation district, its purpose being to withdraw irrigation water from river which conducts it, under control of Nejapa storage dam 80 km to northeast; derivation site; topography; geology; factors influencing selection of site; design of dam, spillway, sand trap, intake, and main canal; experimental work; construction.

Penstocks, Welding. Welding and Testing Shasta Dam, G. L. Yetter. *Eng. News-Rec.*, vol. 128, no. 15, Apr. 9, 1942, pp. 542–545. Main-unit penstock systems at Shasta Dam consist of five all-welded pipes 15 ft in diameter with branches to station service units; field fabricating plant, one mile from dam, is equipped with alternating current, automatic arc-welding outfit that completes welds of all plate-metal thickness $^3/_4$ to $2^1/_2$ in. in only two passes, using special flux to exclude atmospheric contaminations of welds.

Reservoirs. Clearing Grand Coulee Reservoir. *Pub. Works*, vol. 73, no. 4, Apr. 1942, pp. 28 and 30. Clearing wooded land for reservoir 151 miles long, covering 82,000 acres, longest man-made lake in country, holding 10,000,000 acre-ft of water.

Reservoirs, Concrete. Building Three-Million-Gallon Concrete Reservoir at Billings, Montana, A. L. Hewett. *Pub. Works*, vol. 73, no. 3, Mar. 1942, pp. 17–18. Details of design and construction of tank with pre-stressed reinforcement and roofed with self-supporting slab dome.

Rock Fill, Australia. Rock-fill Dam in Queensland. *Concrete & Constr. Eng.*, vol. 37, no. 3, Mar. 1942, pp. 97–99. Since 1935, supply of water to Toowoomba had been diminishing gradually, and construction of dam became necessity; maximum length of crest, 678 ft; top width, 16 ft; maximum height to crest, 100 ft; maximum depth from top water level to approximate rock foundation, 86 ft, leaving freeboard of 14 ft; preliminary work; design and construction.

Rock Fill, North Carolina. More Power for Bomber Production. *Eng. News-Rec.*, vol. 128, no. 9, Feb. 26, 1942, pp. 334–337. Description of Glenville Dam being built by Aluminum Company of America to provide added power for aluminum production; dam is of rock and earth-fill type, 900 ft long, with maximum height of 150 ft and net volume of 1,060,000 cu yd; spillway of new design is described.

Weirs. Design of Hydraulic Structures Resting on Clayey Soils, A. N. Khosla. *Water & Water Eng.*, vol. 44, no. 550, Mar. 1942, pp. 54–57. Limitations of design and constructional principles in case of structures on clayey subsoil or sand with clay substratum are shown in following examples: Suleimanki weir of Sutley valley founded on sand with layer of clay about 10 ft deep; and Khanki weir with central undersluices founded on sand overlying clay substratum.

FLOOD CONTROL

California. Annual Report on Hydrologic Data, Season of 1939–40. *Los Angeles County Flood Control District—Hydraulic Division*, Oct. 1, 1941, 221 pp. Report includes data collected and compiled by District's Hydraulic Division on precipitation, evaporation, runoff, dam operation, ground water, and conservation; these data are basic for planning, design, and operation of flood control and conservation projects.

FLOW OF FLUIDS

Measurement. Analyzing Flow from Multiple Reservoirs by Hardy Cross Method, J. F. Muir. *Eng. News-Rec.*, vol. 128, no. 11, Mar. 12, 1942, pp. 408–409. Method free of complex mathematical relations is developed for application of Hardy Cross method to determination of flow from multiple-reservoir system; actual application of method to three-reservoir problem is described, step-by-step procedure being illustrated.

FOUNDATIONS

Bridge Piers. Underground Water Supply Complicates Bridge Pier Construction, W. H. Townsend. *Eng. News-Rec.*, vol. 128, no. 13, Mar. 26, 1942, pp. 495–497. Foundation piles for highway bridge now being built to span Illinois River at Peoria penetrate water-bearing stratum from which water for Peoria is obtained; special precautions taken during pier construction are described to prevent pollution of this supply, and procedure followed when unstable gravel complicated foundation work at west abutment.

Caissons. Caisson Construction, J. M. Antill. *Civ. Eng.* (London), vol. 36, no. 426, Dec. 1941, pp. 630–633. Description of construction of caisson forming main pier of new road bridge over Hawkesbury River at Peats Ferry, N.S.W., caisson is 50 ft 6 in. long by 22 ft 6 in. wide, with semicircular ends (11-ft 3-in. radius). From *Commonwealth Engr.*, Apr. 1940.

Pile. Fundamental Application of Soil Mechanics to Piled Foundations, S. Sehested. *Eng. Assn. Malaya—J.*, vol. 9, no. 1, Apr. 1941, pp. 4–24. Study of behavior of single pile dealing with interaction of soil, pile, and structure; dynamic and static formulas for carrying capacity of piles; loading tests; deformation; behavior of piles in groups; main types of piled foundations; selection of type of piles.

Pile. Piled Foundations, S. Packshaw. *Mech. World*, vol. 111, no. 2884, Apr. 10, 1942, pp. 328–331. Article deals with various systems in present-day use, their application and equipment used. Before Manchester Assn. Engrs.

Retaining Walls. Salt Water Barrier at Cooke, C. G. Beardslee. *Western Construction News*, vol. 17, no. 2, Feb. 1942, pp. 53–55. Impervious earth dike with timber sheetpile cutoff wall retains winter runoff of Santa Ynez Creek for infiltration to wells supplying water to new triangular division camp at Lompoc, Calif.; dike prevents encroachment of salt water.

HYDRAULIC ENGINEERING

Cavitation. Resistance to Cavitation Erosion, R. Beeching. *Metallurgia*, vol. 25, no. 148, Feb. 1942, pp. 109–112. Mechanism of cavitation erosion discussed; it is concluded that attack is primarily of mechanical nature; corrosion plays part similar to that played in lowering fatigue limit of metal in corrosive medium; vibratory cavitation-erosion testing apparatus described; results of tests on alloys suitable for propellers and pump impellers are given. From Instn. Engrs. & Shipbldrs. in Scotland—Preprint February 1942.

Hydraulics, Research. Investigations of Iowa Institute of Hydraulic Research 1939–1940, J. W. Howe. *Iowa Univ.—Studies in Eng.—Bul. No. 26*, Dec. 1941, 52 pp. Bulletin contains following papers: Need for Standardization of Terms Used in Studies of Transportation and Deposition of Sediment, E. W. Lane; Suspension of Sediment in Upward Flow, H. Rouse; Functional Design of Flood Control Reservoirs, C. J. Posey and Fu-Te I; Hydraulics of Vertical Drain and Overflow Pipes, A. A. Kalinske; Reference List of Staff Publications; U.S. Engineer Office Reports.

Spillways, Model Testing. Model Study of Spillway for Denison Dam, Red River. *U.S. Waterways Experiment Station—Tech. Memo. No. 177—1*, Dec. 15, 1941, 36 pp., tables, supp. plates. Model study performed at U.S. Waterways Experiment Station of spillway for Denison Dam, Red River; general purpose of study was to investigate hydraulic capacity of spillway, to improve flow characteristics, and to develop means of correcting any uneconomic or undesirable conditions found to exist in spillway design.

Waves, Ocean. Sea Waves, J. M. Lacey. *Dock & Harbour Authority*, vol. 22, no. 255, Jan. 1942, pp. 45–48. Effect of sea waves on harbor works; Rankine's theory of rolling waves; period and speed of waves; waves of translation; ground swell; height of waves; force of waves; examples of force of waves.

HYDROELECTRIC POWER PLANTS

Washington. Grand Coulee Goes to Work. *Elec. Light & Power*, vol. 20, no. 2, Feb. 1942, pp. 38–43. Features of largest hydroelectric generating set ever built are described; ultimate plans call for 18 generators, of 108,000 kw each, and development of 92% of fall of Columbia River between Canadian border and sea.

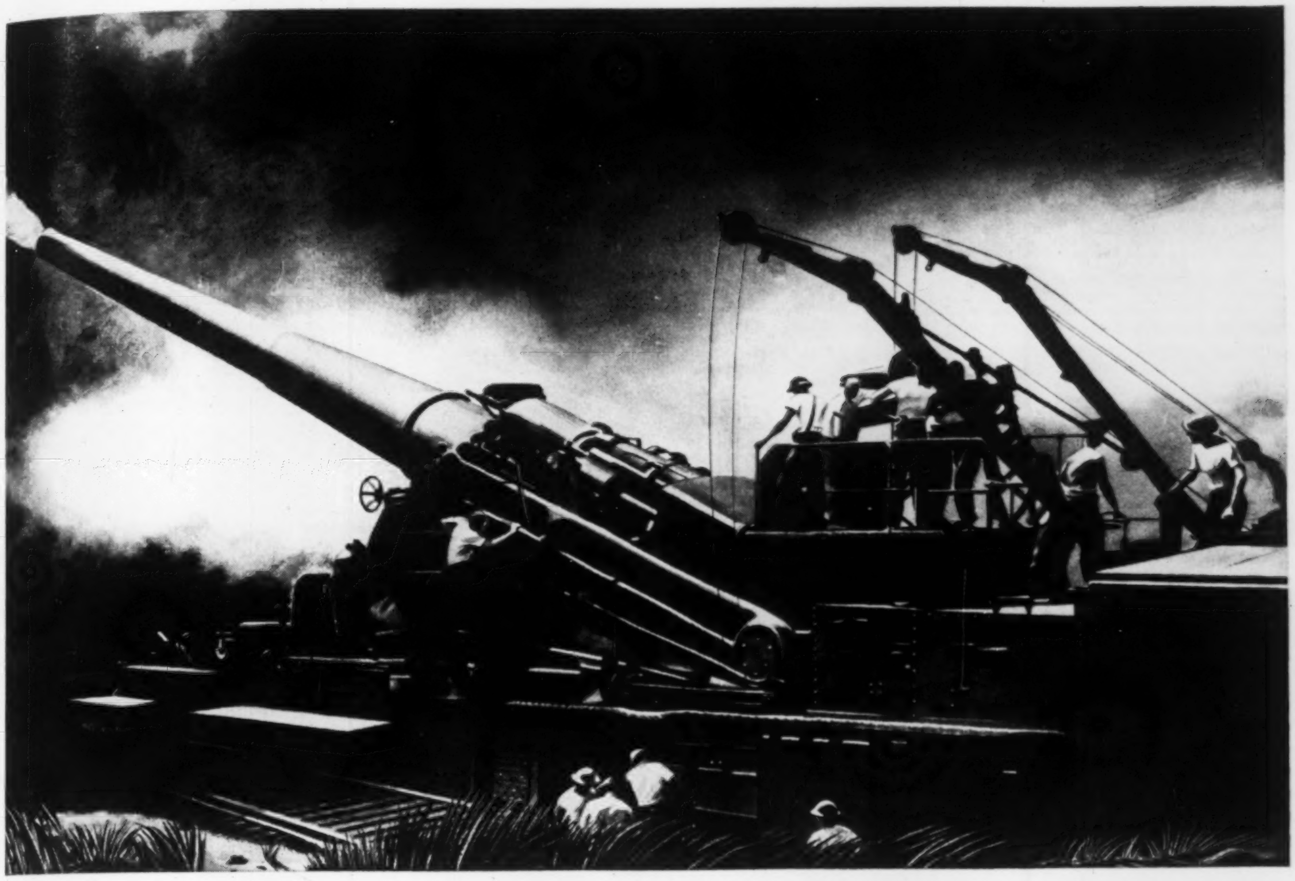
HYDROLOGY AND METEOROLOGY

Alaska. Results of Observations Made at United States Coast and Geodetic Survey Magnetic Observatory at Sitka, Alaska, in 1929 and 1930, H. H. Howe. *U. S. Coast & Geodetic Survey*, 1941, 123 pp. Report is mainly statistical but also includes reference to instruments used, constants of magnetography, absolute observations and baseline values, description of diurnal variation tables, and magnetic storms.

Erosion. Effect of Mulching and Methods of Cultivation on Runoff and Erosion from Muskingum Silt Loam, H. L. Borst and R. Woodburn. *Agric. Eng.*, vol. 23, no. 1, Jan. 1942, pp. 19–22, (discussion) 22 and 24. Results of study designed to investigate mechanics of action of mulches in controlling erosion and to determine relative importance of rain drop impact and overland flow: importance of drop impact compared with overland flow; effect of surface preparation on erosion and runoff. Bibliography. Before Am. Soc. Agric. Engrs.

Oil Wells, Earthquake Effect. Los Angeles Basin Earthquake of October 21, 1941, and Its Effect on Certain Producing Wells in Dominguez Field, Los Angeles County, California, K. M. Bravinder. *Am. Assn. Petroleum Geologists—Bul.*, vol. 26, no. 3, Mar. 1942, pp. 388–399. Southwestern part of Los Angeles Basin was affected; epicenter of this shock was at point along Newport-Inglewood fault zone about 3 miles southeast of center of Dominguez oil field; casing in 15 flowing wells was damaged; tabulation of information concerning damaged wells; relation of damage to structure; possibility of further damage.

Runoff. Outlet Design for Terraced Lands, D. Christy. *Agric. Eng.*, vol. 23, no. 1, Jan. 1942, pp. 12–14. Estimation of runoff is one of more difficult problems of outlet design; rational runoff formula may not be most accurate method



Feeding War Dogs

ANOTHER JOB FOR WICKWIRE ROPE

We'll be glad when it's over . . . when Wickwire rope can get back to the jobs of a world at peace.

The quickest way from here to there is for us, and for you, each day *now*, to put everything we have into winning.

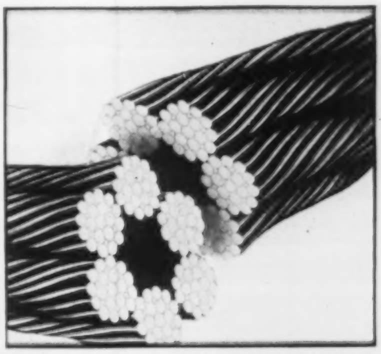
We are doing it by working day and night, seven days a week, on Wickwire Rope for our shipyards, our Liberty Fleet, the army, marine corps, coast guard and navy . . . and for industries whose production is so urgently needed.

You are contributing when you take care of your wire rope, making it last longer . . . so that there is more available for war needs.

But when you *must* have new wire rope, for war production or for essential services, ask your distributor for long-life *Wickwire* Rope. Both Wickwire regular lay and pre-formed Wissco Lay have quality that has made them famous for *low cost per year of use*. We put that into Wickwire rope by controlling every step from ore pile, through blast furnaces, open hearths, precision wire drawing, and skillful laying of the rope.

. . .

A FREE BOOK, "Know Your Ropes," is waiting here for you. More than 25,000 wire rope users all over the world consider this a bible on the selection of wire rope—*and making it last longer*. Write Wickwire Spencer Steel Company, 500 Fifth Ave., New York, N. Y.



REVERSE ROPE FOR LONGER LIFE
Frequently, most severe strain, due to close bending, occurs near one of the ends. Rope life is increased by exchanging the drum end with the load end. This and forty more rope life-savers are fully described in the free book, "Know Your Ropes."

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER

WICKWIRE
WICKWIRE SPENCER STEEL COMPANY

WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

WS
WISSCO PRODUCTS

of estimating runoff, but it is method most commonly used; frequency; time of concentration; area; unit hydrograph; outlet cost; meadow strip or pasture outlet may be solution to many outlet problems; cost of terrace outlet must be figured on long-time basis. Before Am. Soc. Agric. Engrs.

United States. Climatological Data for United States by Sections. *U.S. Weather Bur.—Climatological Data*, vol. 28, no. 7, July 1941, 42 pp., maps. Volume contains climatological data for United States, arranged alphabetically by states; data on temperature and precipitation.

IRRIGATION

Canals, Brick Lining. How to Line Canals with Brick, W. I. Gilson. *Eng. News-Rec.*, vol. 128, no. 9, Feb. 26, 1942, pp. 350–352. Advantages of reinforced brick lining for canals are explained, and correct construction procedures are described.

Mexico. Algunas Ideas Sobre La Conservacion de Obras de Riego, J. Tamayo. *Irrigacion en Mexico*, vol. 22, nos. 2 and 6, March–April 1941, pp. 155–175, and November–December, pp. 427–465. Some ideas on conservation of irrigation works; definition of terms—operation, conservation, and maintenance; works of substitution and important improvements should be done by construction department, independent of operating and conservation organization; damage results from failures in conservation; legal aspects; conservation of canals; structures and storage reservoirs. (To be continued.)

LAND RECLAMATION AND DRAINAGE

Drainage Pipe. Clogging Hazards in Underdrains. *Eng. News-Rec.*, vol. 128, no. 11, Mar. 12, 1942, pp. 400–401. Report on series of tests carried out at U.S. Waterways Station, Vicksburg, Miss., on six types of pipe used in ten arrangements; freedom from clogging in pipe underdrains is greatest when pipe is of porous concrete or of metal perforated on under side.

Farm Lands. Drainage as Conservation Practice, L. A. Jones. *Agric. Eng.*, vol. 23, no. 3, Mar. 1942, pp. 97–98. Details pertaining to drainage of farm lands; part played by land drainage in development of American agriculture. Before Am. Soc. Agric. Engrs.

Landslides. Pipe Drains Stop Earth Slide. *Eng. News-Rec.*, vol. 128, no. 15, Apr. 9, 1942, pp. 539–540. Description of method of putting down vertical holes, 30 in. in diameter and 5 ft center to center, from bottom of which perforated drainpipes have been placed below original ground and rock line.

Recreation Grounds. Drainage of Recreation Grounds. *Pub. Works*, vol. 73, no. 5, May 1942, pp. 22–24. Why drainage is necessary for golf courses, tennis courts, baseball and football fields, running tracks, and playgrounds, and how to secure it by proper construction.

Runoff. Die Wirkung der Regenauslaesse, A. Hoerler. *Schweizerische Bauzeitung*, vol. 118, no. 20, Nov. 15, 1941, pp. 229–234. Theoretical discussion of runoff from drainage areas; analysis of characteristic curves for intensity and amount of rainfall; runoff coefficients and formulas for calculating runoff data; results arranged in diagrams. Bibliography.

San Francisco. San Francisco Bay Project. *Western Construction News*, vol. 17, no. 3, Mar. 1942, pp. 102–105. Reber Plan proposes that south arm of San Francisco Bay and smaller bays north of San Quentin Point be transformed into fresh-water lakes by construction of earth and rock-fill dikes which would provide new land areas for military and naval establishments, industrial development, and unlimited transportation facilities; map is provided.

Soil Mechanics. Soil Mechanics Applied to Soil Drainage, J. D. Watson, *Roads & Streets*, vol. 85, no. 3, Mar. 1942, pp. 36–37. Description of tests for determination of velocity with which water would move through given soil mass can be easily made, and this result, modified by practical experience, will furnish excellent criterion for determining whether underground drainage in this particular soil would be effective.

Soils, Erosion. Controlling Erosion in Farm Drainageways. *Agric. Eng.*, vol. 23, no. 4, Apr. 1942, pp. 136–137. Necessity for properly protected field drainageways; seeding; mulching; sodding; structures; location, size, and shape; soil; limits of use of vegetation; blue-grass is most desirable vegetation to prevent erosion in waterways; types of vegetation; methods of establishing and maintaining.

Tobacco Growing. Improved Row System for Terraced Fields, T. L. Copley. *Agric. Eng.*, vol. 23, no. 3, Mar. 1942, pp. 95–96. Notes on improved row system, or "string method," first tried during 1936 and 1937 on tobacco fields in Bannister River demonstration project area of Soil Conservation Service, near Danville, Va.; it has since been studied further on field trial basis in tobacco-growing area; results have been sufficiently satisfactory for tobacco field trial committee of Region 2 to recommend it for general use on tobacco land. Before Am. Soc. Agric. Engrs.

MATERIALS TESTING

Cement. Progress in Long-Time Study of Cement Performance in Concrete, F. R. McMillan. *Am. Concrete Inst.—J.*, vol. 13, no. 5, Apr. 1942, pp. 441–446. Objectives in investigation are twofold: first, to learn to what extent differences in cement affect performance of concrete; second, to learn what factors are responsible where differences in performance are found. Progress to date is presented.

Cement. Untersuchung von Sonderzementen in der Versuchsanstalt und in der Strasse, O. Graf and K. Walz. *Zement*, vol. 30, nos. 15, and 17, Apr. 10, 1941, pp.191–194, and Apr. 24, pp. 219–224. April 10: Experiments conducted with special cements in laboratory and street; testing specimens 56 × 10 × 10 cm for tensile strength during bending and compression; chemical composition, shrinkage of prisms, and elongation of steel rod embedded in prisms are tabulated for specimens of cement and mortar tested in laboratory. April 24: Results conducted in laboratory and on sample roadway; data tabulated and shown in diagrams. Bibliography.

Concrete Products. Prevention of Cracking, P. Woodworth. *Rock Products*, vol. 45, no. 3, Mar. 1942, pp. 79–80. Concrete masonry units laid in wall in green or moist state will at some later date dry out, and shrinkage may be sufficient to cause wall cracking; to investigate effect of moisture content, Portland Cement Association tested 24 panels of concrete masonry units with 3 types of aggregates.

MUNICIPAL ENGINEERING

Post-War. Post-War Planning and Municipal Engineer. *Roads & Road Construction*, vol. 20, no. 231, Mar. 2, 1942, pp. 39–40. Review of aspects of problem associated with local government, particularly road construction and general land utilization.

PORTS AND MARITIME STRUCTURES

Cargo Handling, Emergency. Pier Operations Under Emergency Conditions, A. J. Corbett. *World Ports*, vol. 4, no. 5, Feb. 1942, pp. 8–10 and 16–17. Present world conditions have created in Port of New York problems in transportation and pier operations similar to those encountered in last war; methods for expediting cargo movements are discussed.

Chicago, Ill. Port of Chicago, Illinois. *Dock & Harbour Authority*, vol. 22, no. 256, Feb. 1942. pp. 55–61. General description; currents; anchorages; weather conditions; bridges; harbor improvements by United States; public terminal improvements; ownership of water front; port administration; dockage; wharfage; lighterage; loading and discharging vessels; labor; port and harbor facilities; commerce.

Drydocks, Australia. Sydney Graving Dock. *Commonwealth Engr.*, vol. 29, no. 7, Feb. 2, 1942, pp. 177–179. Dock in Sydney Harbor will be of mass concrete founded on rock, with walls of gravity-type section and extending 40 ft beyond south end to allow of future extension in length of dock, to be accomplished with minimum of construction; will dock largest vessels; preliminary investigations and works; construction of enclosing embankments and dredging.

Hong Kong, China. Port of Hong Kong, D. J. Owen. *Dock & Harbour Authority*, vol. 22, nos. 254, 255, and 256; Dec. 1941, pp. 23–26; Jan. 1942, pp. 39–44; and Feb., pp. 65–69. Report on future control and development; existing facilities of port; map showing development scheme of port, is given; proposed port administration; government policy.

Port Structures, Disintegration. Destruction of Timber by Marine Organisms in Port of Sydney, R. A. Johnson and F. A. McNeill. *New South Wales—Maritime Services Board—Supp. Report*, no. 2, July 17, 1941, 92 pp. Report of experimental research dealing with economic aspects of crustacean borers, value of marine growths as arresting agents, and effects of fresh water on Cobra borer mortality; description and varied applications of plastic compound for underwater use.

Transportation Problems. Importance of Local Transportation Problems, A. Serkes. *World Ports*, vol. 4, no. 6, Mar. 1942, pp. 9 and 18. Brief commentary on transportation problems in New York; outline of methods adopted by New York port authorities to handle transportation problems and facilitate movement and storage of ship cargoes to relieve congestion at docks.

Wood Preservation. Protection of Harbour Piles and Woodwork Against Borers, E. Hardy. *Shipbldr. & Mar. Engine-Bldr.*, vol. 49, no 392, Mar. 1942, pp. 58–59. Damage caused by marine borers to submerged timbers; notes on methods of protection.

PUBLIC WORKS ENGINEERING

Geologists. Geologist in Public Works, C. P. Berkey. *Geol. Soc. America—Bul.*, vol. 53, no. 4, Apr. 1, 1942, pp. 513–532. Many of dangers accompanying building of large engineering structures are of geological origin, and it is one of chief responsibilities of geologist to point this out in time to avoid accident; commonest danger is from falling rock in excavations, such as those for foundations in the open, from roof in rock tunnels, and from caving or running ground charged with water and mud; dam foundations; various other points discussed.

ROADS AND STREETS

Airport Runways. Longitud de pistas en los proyectos de aeropuertos, E. Terradas. *Ingenieria* (Buenos Aires), vol. 45, no. 803, Sept. 1941, pp. 937–944. Length of runways in airport projects; mathematical discussion of airport design factors.

Airport Runways, Soil Cement. Soil Cement Pavement. *Construction Methods*, vol. 24, no. 3, Mar. 1942, pp. 49–52. Soil-cement construction employing 90% mill chats, finely ground quartz rock fragments from waste dumps of ore treatment plants at metal mines, has been used to pave 360,000 sq yd of motor parking areas, at bomber assembly plant in Southwest.

Asphalt. Wartime Requirements for Asphalt, G. Abson. *Nat. Petroleum News*, vol. 34, no. 7, Feb. 18, 1942, pp. R-60 and R-62. Brief general commentary on uses of asphalt; statistical data; typical specifications for bituminous materials for airport work; examples of uses of asphalt in airport constructions.

Bituminous. Road Experiments on Design of Thin Bituminous Surfacings, R. Slater. *Roads & Road Construction*, vol. 20, nos. 229 and 230, Jan. 1, 1942, pp. 7–9, and Feb. 2, pp. 28–30. Results of road tests made on carpets having stone skeleton with voids partially filled with mortar; description of materials used, and mixing and laying operations; experience with granite-bitumen, granite-tar, and gravel-bitumen carpets after 2 years' wear; discussion of results and conclusions.

Concrete. Concrete Pavements Opened to Traffic in 24 Hours. *Eng. & Contract. Rec.*, vol. 55, no. 8, Feb. 25, 1942, pp. 66–67 and 75. On concrete repaving jobs, where closing of roads is impossible for any length of time, high early-strength concrete may be obtained by use of calcium chloride as accelerator plus extra bag of portland cement per cubic yard of concrete.

Concrete. Points to Be Noted in Preparing Specifications for Concrete Roads. T. R. Grigson. *Surveyor*, vol. 101, no. 2617, Mar. 20, 1942, pp. 99–101. Specifications as they relate to use of clean, durable aggregates, and their suitable grading, from fine to coarse particles to ensure density and workability; proportion of cement to aggregates to ensure strength; use of as little mixing water as possible to give required degree of workability, mixing, compaction, and curing.

Concrete. Simplifying Concrete Street Construction. *Eng. News-Rec.*, vol. 128, no. 9, Feb. 26, 1942, pp. 337–338. Concrete streets in Mobile, Ala., are built so that surface has straight slopes at three different angles leading from center line to curb; this eliminates need for skilled finishers required to form parabolic crown surface, and method of construction minimizes longitudinal cracking; new development in curb construction is also described.

Design. Economic Factors Involved in Proposed Highway Construction, W. L. Anderson. *Roads & Streets*, vol. 85, no. 3, Mar. 1942, pp. 38–41. General benefits to be derived from properly planned and designed system of highways; economic consideration from user point of view concerning design speed, by-pass, location, grades, sight distance, 4-lane roads, maintenance cost, and roadside development.

Design. New Standards of Construction for Main and Secondary Roads, H. G. Sours. *Eng. & Contract. Rec.*, vol. 55, no. 2, Jan. 14, 1942, pp. 12–15 and 21. Outline of design specifications for modernizing existing highways and construction of new roads; stress placed on problems of improving roads to accommodate large volumes of traffic quickly and safely through large cities.

Design. Psychology in Highway Design, S. M. Spears. *Western Soc. Engrs.—J.*, vol. 46, no. 6, Dec. 1941, pp. 275–287. Importance of human elements in problems of highway design; factors affecting visibility; signs; signals and markings; principles of perceptual organization; perception of distance and speed; relation between speed and cross-over distance.

Gravel. Keeping Gravel-Surfaced Roads Free from Corrugations, E. S. Rankin. *Pub. Works*, vol. 73, no. 5, May 1942, pp. 34 and 39–40. Five conditions that cause corrugations, and remedies suggested by experiences in maintaining such roads in Minnesota.

Highway Systems, Ontario. Final Link of Trans-Canada Highway in Northern Ontario, T. F. Francis. *Roads & Bridges*, vol. 80, no. 1, Jan. 1942, pp. 24–27 and 68 and 70. Contract-by-contract survey of progress accomplished on road construction during past year and present status of work; weather problems presented greatest difficulty; standards of construction and how problems were met are discussed.

Highway Systems, Panama. Eastern Panama Explored for Possible Highway Route, R. Tewkesbury. *Roads & Streets*, vol. 85, no. 3, Mar. 1942, pp. 33–35. Report of author's findings concerning topography covered, soil conditions, and attitude of natives in eastern Panama with regard to potential highway from Panama City to Colombian border; possible highway routes discussed

FROM THESE AISLES
ROLL ENGINES
OF VICTORY...

Taken in the Chrysler Tank Arsenal

Stretching farther than the eye can see, these busy aisles are the birthplace of one of mechanized war's most potent weapons. Here American productive genius is turning out rolling fortresses with the same smoothness with which it once produced motor cars.

This mighty tank arsenal was built by Bethlehem in 70 days—built in the dead of winter, in snow, slush, icy mud and biting gales. Now Bethlehem is completing an addition to the original structure—and doing the job with the same accent on speed and efficiency.

In the war emergency, with the need to build so much of America's arsenal from the ground up, speed in steel construction has been called for as never before. Bethlehem's combination of coordinated steel-making and steel-fabricating plants, engineering skill, and *know-how* accumulated through many years, has saved priceless time in the completion of a long list of war production buildings.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

INTERSECTIONS. Constructing Colorado's First Clover Leaf, E. F. Williams. *Roads & Streets*, vol. 85, no. 4, Apr. 1942, pp. 54, 56, 58, 62, and 64. Details of clover-leaf grade separation involving highway and railroad-bridge construction at Denver, Colo.

RECONSTRUCTION. Light Reflecting Surfaces on Strategic Highway, C. R. Hanes. *Construction Methods*, vol. 24, no. 2, Feb. 1942, pp. 64–67, 78, 80, and 84. Rebuilding, widening, and paving 11.783-mile section between Medina and Akron; features of improvement are use of light reflecting surfaces of white cement along median strips separating traffic ways and large area of brick paving with bituminous joint filter.

SOIL SURVEYS. Soil Mechanics Studies and Reconstruction Work, V. J. Brown. *Roads & Streets*, vol. 85, no. 3, Mar. 1942, pp. 25–32. Detailed report of analysis made on section of road in Kern County, California, prior to construction of four-lane divided highway where slide conditions had been encountered; tables and calculation shown of Swedish method of analysis to critical section.

SNOW AND ICE CONTROL. Salt Treatment for Icy Roads, *Roads & Road Construction*, vol. 20, no. 229, Jan. 1, 1942, pp. 10–11. Wartime road note No. 4 issued by Department of Scientific and Industrial Research, Road Research Laboratory, in cooperation with Ministry of War Transport; recommendations concerning water-bound surfacings; tarbitumen bound surfacing and concrete roads.

UNITED STATES. Road to Victory, A. R. Ginsburgh. *Construction Methods*, vol. 24, no. 2, Feb. 1942, pp. 42–45, 126, 128, 130, 132, 133, and 137. Relation of highways to warfare and to industrial production for war needs; author explains role that highways played in recent large-scale army maneuvers in South and discusses road building and maintenance lessons learned from that experience under conditions of simulated warfare.

SEWERAGE AND SEWAGE DISPOSAL

ACTIVATED SLUDGE. Has Use of Activated-Sludge System Been Justified, A. E. Berry. *Water & Sewage*, vol. 80, no. 2, Feb. 1942, pp. 17–20. Review of development and experiences with system introduced in Canada in 1918; advantages of activated sludge and difficulties of system in small plants.

CHLORINATION. Research and Control, N. J. Howard. *Water & Sewage*, vol. 80, no. 3, Mar. 1942, pp. 29–30 and 47. Advantages and accomplishments of chlorination as used in plants of United States and Canada; results and experience from Toronto and Buffalo.

FOND DU LAC, WIS. Improved Plant Treats Sewage Tannery Wastes and Garbage, J. Donohue. *Sewage Works Eng.*, vol. 13, no. 4, Apr. 1942, pp. 188–192. General discussion of sewage treatment and garbage disposal serves as introduction to author's experiences with plant at City of Fond du Lac, Wis., where solution of different problems was obtained by construction of central plant; plant is adapted to reduction of garbage, treatment of sewage, production of fertilizer, and disposing of waste material at minimum cost.

INDUSTRIAL WASTE. Alternating Double Filtration, A. Parker. *Water & Sewage*, vol. 80, no. 3, Mar. 1942, pp. 27 and 46. Extracts from article, "New System of Treatment of Sewage and Trade Effluents," before joint meeting of Instn. Chem. Engrs. and Soc. Chem. Industry, previously indexed from various sources.

MAINTENANCE AND REPAIR. Copper Sulfate as Aid to Sewer Maintenance and Sewage Treatment, J. W. Hood. *Water Works & Sewerage*, vol. 89, no. 3, Mar. 1942, pp. 121–123. Copper sulfate is applied to following: odor control, reduction in chlorine requirements, better and less costly treatment at sewage plant and root removal; article presents experiences with its use at Ridgewood (N.J.) plant.

MILITARY CAMPS. Special Sewage Problems at Army Cantonments, C. H. Capen and H. S. Montin. *Sewage Works Eng.*, vol. 13, no. 4, Apr. 1942, pp. 197–198 and 217–218. General remarks on necessity of proper camp sanitation; policy of War Department in specifying treatment methods; load problems of plants; personnel; correlating designs in different parts of same army area to differences in rules laid down by respective states.

OHIO. Comparative Study of Performances of Municipal Sewage Treatment Plants Incorporating Application of Chemicals at Wilmington and Lebanon, Ohio. *Ohio Dept. Health—Report*, June 16, 1941, 33 pp., maps, tables. Report on performance covering test period from July 9, to Oct. 10, 1940; method of study comprised collection of hourly composited samples for analysis in Central laboratory supplemented by field data; results are representative of averages and variations to be expected from chemical sewage treatment.

SEWERS, THAWING. How Fairbanks Prevents Its Sewers from Freezing, C. Bryant. *Pac. Bldr. & Engr.*, vol. 48, no. 3, Mar. 1942, pp. 46–47. Details of electrical thawing method installed in Fairbanks, Alaska, sewer lines.

UNITED STATES. Developments and Trends in Sewerage Practices of 1941, S. A. Greeley and P. Hansen. *Water Works & Sewerage*, vol. 89, no. 2, Feb. 1942, pp. 51–64. Review of developments in municipal field: Ohio River survey; activated sludge plant in southwest Chicago; sewage treatment progress in Greater New York, Philadelphia, Boston, Pasadena, Hampton Roads, East Bay Cities; development in camps and defense industries sewerage; settling tanks; tapered aeration and incremental dosing; high capacity filters; cathodic protection; paints and coatings.

WAR TIME. War Time Problems in Sewage Treatment. *Sewage Works Eng.*, vol. 13, no. 4, Apr. 1942, pp. 193–196 and 215. Symposium of following aritcles: Preparing Buffalo Plant Against Air Raid, J. W. Johnson and G. E. Symons; War Time Biologicals Affect Pearl River Plant, J. R. Scovill.

WASTE UTILIZATION. Recovery of Chemicals from Pickling Liquor and Copperas Waste, H. W. Gehm. *Indus. & Eng. Chem.*, vol. 34, no. 3, Mar. 1942, pp. 382–384. Treatment of copperas waste liquors with sodium silicate and soda ash to produce sodium sulfate of high purity is possible by simple process; ferric chloride can be produced from copperas by converting free acid to iron sulfate with iron scrap and converting sulfate to chloride with calcium chloride; subsequent chlorination of ferrous chloride gives ferric chloride; etc. Bibliography.

WATER POLLUTION. Pollution—Perennial Headache, R. M. Searls. *Min. Congress J.*, vol. 28, no. 3, Mar. 1942, pp. 30–32 and 37. Responsibility for, and manner of, stream clarification cannot be settled at one fell swoop by drastic action of federal and state officials, but calls for cooperation with private industrial interests and sportsmen to achieve solution; industrial waste, coal mine refuse, ore treatment tailings, and municipal sewage continue to pollute streams; local conditions should govern regulation.

STRUCTURAL ENGINEERING

CONCRETE DESIGN. Essentials of Reinforced Concrete Design, O. Albert. *Concrete*, vol. 50, nos. 1, 2, 3, and 4, Jan. 1942, pp. 11–14 and 45; Feb. pp. 41–44; Mar. pp. 41–43; and Apr. pp. 33–37. January: Formulas are given for design of rectangular beams and slabs having steel on tension side only. February: Formulas for design of rectangular beams having steel reinforcement on compression side as well as in tension. March: Design of concrete beams with help of tables and charts. April: Charts for reinforced concrete beams.

RETAINING WALLS. Retaining Walls, R. R. Minikin. *Engineering*, vol. 153, no. 3967, Jan. 23, 1942, pp. 61–63. Author recommends that effective pressure base of retaining wall should be normal to direction of resultant thrust, and dimensioned to give uniform pressure over base; in other words, stress is transmitted normally and uniformly on supporting soil.

STANDARDS, UNITED STATES. Notes for National Bureau of Standards. *Franklin Inst.—J.*, vol. 233, no. 4, Apr. 1942, pp. 381–389. Structural Protection Against Incendiary Bombs; Evaluation of Processes for Production of Rubber; Calcium Carbonate in Rubber; Tensile Elastic Properties of Metals; Temperature Estimates of Planet Mars.

STRESSES. Buckling of Compressed Bars by Torsion and Flexure, J. N. Goodier. *Cornell Univ. Eng. Experiment Station—Bul.*, no. 27, Dec. 1941, 32 pp. Problem of elastic buckling of columns and stiffeners of thin open sections by twisting and bending, under uniform thrust; clarification of scope of Wagner's formula for torsional buckling; explicit formulas for calculation of critical stresses in general and particular cases; solution of problem of bar attached to flexible sheet, and bar with constrained axis of rotation. Bibliography.

STRESSES. Initial Stress and Elastic Instability, H. Jeffreys. *Cambridge Philosophical Soc.—Proc.*, vol. 38, Pt. 1, Jan. 1942, pp. 125–128. Mathematical discussion of case of body initially stressed with only displacements from stressed state whose squares can be neglected. Bibliography.

TUNNELS

AQUEDUCTS, DELAWARE RIVER. Engineering Geology of Delaware Aqueduct, T. W. Fluhr. *Mun. Engineers J.*, vol. 27, Third Quarterly Issue 1941, pp. 91–126. Paper deals with general geologic aspects of area affected and specifically with geology of those sections of work where construction problems of more than usual difficulty were encountered.

CONSTRUCTION, ACCIDENT PREVENTION. Safety in Rock Tunnel Construction, F. W. Stiefel. *Gen. Contractors Assn.—Bul.*, vol. 33, no. 3, Mar. 1942, pp. 49–53. Discussion concerns health and safety measures as applied upon Contract 313, 15 miles of deep rock tunnel constructed under supervison of Board of Water Supply as part of 85-mile New York City Delaware River Aqueduct.

CONSTRUCTION. Highway Tunnels. *Construction Methods*, vol. 24, no. 3, Mar. 1942, pp. 62–63, 126, and 128. Two 32-ft diameter rock tunnels, one 726 ft and other 1,037 ft in length, form integral part of Clear Creek highway, 14-mile scenic route between Golden and point of intersection with Highway 40 near Idaho Springs, Colo.; muck from tunnels is used in constructing roadway between portals of two bores; methods and equipment employed by contractor are illustrated.

CONSTRUCTION. Tunnel Mucking, H. W. Richardson and R. S. Mayo. *Construction Methods*, vol. 24, no. 1, Jan. 1942, 10 pp. between pp. 58 and 83. Survey of current practice covering methods and equipment used for removing blasted rock.

WATER SUPPLY, COLORADO. New Ventilating System of Continental Divide Tunnel, H. R. Wallrath. *Mines Mag.*, vol. 31, no. 12, Dec. 1941, p. 609. Brief notes on system consisting of heavy duty blowers powered by General Electric 2,200-v, 100-hp motors, connected to blowers by means of V belts; blowers are being installed every 9,000 ft; fans exhaust for approximately 20 min, and are then reversed to blow fresh air into tunnel; tunnel will connect Estes Park and Grand Lake, Colo., to bring water from western slope of Continental Divide to eastern side, where it will be used for irrigation.

WATER SUPPLY, NORWAY. Norwegische Methoden zur Absenkung von Seen, D. H. Lund. *Schweizerische Bauzeitung*, vol. 117, no. 23, June 7, 1941, pp. 271–274. Some examples are described of Norwegian practice in connecting lakes, situated 800 to 1,000 m above sea level with hydroelectric plants on sea coast; notes on construction of tunnel connecting Lake Markevann with 4,500-hp hydroelectric plant, and tunnel connecting lake Skorgevann; tunnel in open sea for supply of sea water from depth of 20 m for chemical factory on southern coast of Norway.

WATER RESOURCES

CAMPS, MILITARY. Underground Storage for Floods Assures Army Camp Water Supply, C. G. Beardslee. *Eng. News-Rec.*, vol. 128, no. 11, Mar. 12, 1942, pp. 406–407. Wastage of flood waters, water scarcity in dry year, and menacing salt water incursion have all been remedied on Santa Ynez River in California by low weir at strategic location; result not only assures supply for 35,000 man-army camp but improves water supply conditions in adjacent areas.

WATER TREATMENT

FILTRATION PLANTS, COLOMBIA. Special Features of Water-Filtration Plants in Colombia, C.S. de Santamaria. *Water & Sewage*, vol. 80, no. 2, Feb. 1942, pp. 22–23. General notes on various systems adopted following American and English practice; plant equipment.

LOS ANGELES, CALIF. Unusually Elaborate Water Treatment. *Water & Sewage*, vol. 80, no. 1, Jan. 1942, pp. 11 and 46. Brief description of new softening and filtration plant in Los Angeles area; source of supply is Colorado River back of Parker Dam; station has 100-mgd capacity with future extension up to 400 mgd.

WATER WORKS ENGINEERING

CANADA. Progress and Prospects in Water Supply and Sewerage Works, A. E. Berry. *Water & Sewage*, vol. 80, no. 1, Jan. 1942, pp. 7–10 and 38. Development during 1941 in field of water main extensions, sanitary program, water treatment, St. Lawrence River project, etc.; future trends.

WAR TIME. Should Chlorine Residuals Be Carried in All Distribution Systems as Wartime Protection Measure? *Water & Sewage*, vol. 80, no. 3, Mar. 1942, pp. 24 and 46–47. Reaction of members of American Water Works Association to recommendation that chlorine residuals should be used throughout distribution system as wartime protection measure.

WAR TIME. War-Time Economy and Operation of Waterworks, E. G. B. Gledhill and A. W. H. McCaulis. *Water & Water Eng.*, vol. 44, no. 550, Mar. 1942, pp. 48–53. Economies which have been effected in Sutton Co. pumping stations, water treatment plants, depots and distribution sections, laboratories, offices, reservoirs, and grounds. Before Instn. of Water Engrs.

WAR TIME. War-Time Water Works Maintenance in Britain, A. C. Wildsmith. *Water Works & Sewerage*, vol. 89, no. 2, Feb. 1942, pp. 65–68. Discussion of following problems with which authorities have been faced: To obtain rapid and accurate information of damage to mains and works to shut off as soon as possible, any broken mains, and to minimize disturbances and repair damage; activity of control room and staff; experiences with bomb damage, fires, sabotage, and protection against it; sterilization of drinking water.

WAR TIME. Water Supply Defense Program, J. A. Jackson. *Water Works & Sewerage*, vol. 89, no. 3, Mar. 1942, pp. 107–110. Activity of Portland, Me., water district, since beginning of war; what was done in reference to technical problems, such as shops, reservoirs, transmission mains; protective actions against possibility of sabotage; some suggestions and additional information concerning cooperation with civil defense authorities, introduction of protective devices against gas, bombs, etc.

Equipment and Materials

Wood Water Towers

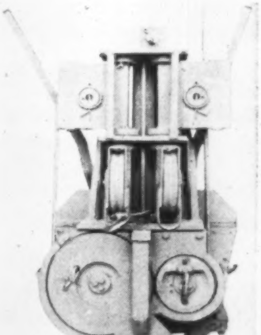
Due to the decision by the War Production Board to decline priorities for steel to be used in the construction of water towers, the Timber Engineering Co., Washington, D.C., has been receiving a growing number of requests for aid in designing wood towers for water tanks. The company has several designs, listed below, on hand, and is distributing them free upon request:

No.	Type	Height	Size
250	Water Tank	30 ft	2,000 gal
250A	Water Tank	30 ft	5,000 gal
12	Water Tank A.R.E.A.	30 ft	50,000 gal
	Water Tank A.R.E.A.	30 ft	100,000 gal
186	Water Tank	60 ft	50,000 gal

Timber Engineering Co. also has in preparation a design for a 100-ft tower to carry a 100,000-gal wood tank, and is interested in hearing from anyone having designs for such towers. This design, also, will be given free to interested parties. The company offers cooperation to any recognized engineer in designing tank towers, and will send complete design data and recommendations to assist him in his design work, and will examine designs submitted and give advice on the adequate use of the timber connector system of construction.

New Power Control Unit

R. G. LeTourneau, Inc., Peoria, Ill., announce the Model GB4 Power Control Unit for use on D4 "Caterpillar" tractors. This unit, developed primarily for military use, provides a single cable line for Dozer operation from one drum while the other serves as a winch with a line pull of 10,000 lbs. The winch drum has a capacity of 265 ft of 1/2 in. cable. The GB4 Power Control Unit is more compact and mounts closer to the tractor than most units for small tractors, thus making for better tractor balance. The clutch and brake are completely enclosed and run in oil. Fewer parts than in former models simplify adjustments and minimize repair.



YOU CAN'T PREVENT LIGHTNING—
D/S
BUT YOU CAN TAME IT
TO PROTECT VITAL WAR PRODUCTION!

Vital war production must be maintained at all costs today. That is why the safeguarding of life and property against accident, sabotage, and even Nature's destructive weapon of lightning has taken on new importance.

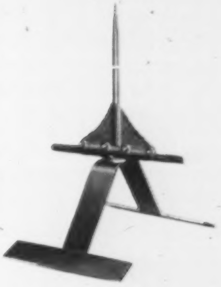
That is also why West Dodd Lightning Protection and static control equipment is being widely used on Army Ordnance Plants in all parts of the country. Helping protect ammunition loading lines, underground magazines, standard magazines, and bag loading buildings.

Many important industrial plants also have West Dodd protection on their power stacks.

WEST DODD PLUS FACTORS

West Dodd represents a consolidation of 12 old line manufacturers, including the famous Dodd & Struthers Company, pioneer of approved lightning protection. This wealth of experience and a long proved record of responsibility are two plus factors.

FREE assistance in planning installations and estimating costs. Telephone or telegraph today.



The West Dodd end aerial, complete. In center is the exclusive West Dodd cable and point connector. It eliminates sharp bends formerly necessary to bond aerial and conductor. Quicker to install. Eliminates a number of connectors. Simplicity adds to efficiency and longer life.

This is one of many West Dodd items developed to meet U. S. Government requirements, cut installation time, and save labor costs while aiming at more lasting, thorough protection.

TELEPHONE OR TELEGRAPH TODAY!

WEST DODD

LIGHTNING CONDUCTOR CORP.
GOSHEN, INDIANA

Layne Quality

Has Set A World Standard!

Efficiency, Ruggedness and Long Life are the three outstanding and world recognized features of Layne Well Water Systems. Those features are the result of more than sixty years of water producing experience, specialized engineering skill and ceaseless endeavor to build better pumps and wells.

Thousands of Layne Well Water Systems are now serving, and have long served leading industrial plants, railroads, irrigation projects and municipalities throughout the United States and the Dominion of Canada. Hundreds also, are in use in foreign countries throughout the world.

Each Layne unit is designed and custom built to fulfill its particular task—the production of the largest quantity of water at the lowest possible operating cost. Various parts of the systems; pumps and component pump parts, motors, etc., are of standard manufacture and dimensions. Thus, repairs or replacements, when required, may be made at minimum cost. Each system is completed as a unit, then thoroughly tested and delivered in operation.

For literature showing superior construction and engineering details, address,

LAYNE & BOWLER, INC.
Memphis, Tenn.

LAYNE PUMPS & WELL WATER SYSTEMS

Affiliated Companies

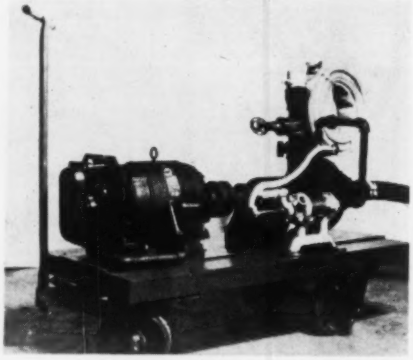
Layne-Arkansas Company	Stuttgart, Ark.
Layne-Atlantic Company	Norfolk, Va.
Layne-Bowler New England Corp.	Boston, Mass.
Layne-Central Company	Memphis, Tenn.
Layne-Northern Company	Mishawaka, Ind.
Layne-Louisiana Company	Lake Charles, La.
Louisiana Well Company	Monroe, La.
Layne-New York Company	New York City
Layne-Northwest Company	Milwaukee, Wis.
Layne-Ohio Company	Columbus, Ohio
Layne-Texas Company	Houston, Texas.
Layne-Western Company	Kansas City, Mo.
Layne-Western Co. of Minn.	Minneapolis, Minn.
International Water Supply, Ltd.	London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

Special Duty Pump Units

DANGERS OF INCENDIARY BOMBS has brought to engineers, factory managers, and municipal officials alike the importance of ever-ready pumping equipment in case of fire. Recently developed fire-pumping units by Fairbanks-Morse now afford small plants and towns fire protection at a moderate cost.

One of these new Fairbanks-Morse Fire Pumping Units, approved by the Underwriters Laboratories, was recently installed in Delavan, Wis. It is composed of a 4-in. Fig. 5813 F-M Fire Pump driven by a Ford-Mercury Engine. The Mercury Engine drive, turning at 2,500 rpm, is of sufficient speed to be direct-connected, eliminating the expense of gear drive necessitated when a slow speed engine is connected to a high speed pump. Another advantage is that re placement parts for the Ford engine are carried in service stations in practically every village in the country.



Fairbanks-Morse has also developed a portable pumping unit. An example of this type of unit consists of a 2-in. non-clogging F-M sludge pump direct-connected to a 3-hp F-M splashproof motor and mounted on a standard warehouse truck with 8-in. rubber-tired wheels. The pump is primed by means of a hand-operated bracket-type pump mounted on the truck platform with its suction connected to the top of the volute through a $^3/_4$-in. pipe line equipped with a shut-off valve. The sludge is picked up through a length of $2^1/_2$-in. wire-lined rubber suction hose and discharged through a length of $2^1/_2$-in. collapsible cotton fabric hose. The discharge hose is fitted with a gate valve to control the head under high suction lift conditions and to seal the discharge of the pump during priming operations.

Peerless Pump Expands

THE PEERLESS PUMP DIVISION of The Food Machinery Corporation, Los Angeles, Calif., has acquired the Sterling Pump Corpn. Sterling's plant at Hamilton will be consolidated with the Peerless plant at Canton, Ohio, and the Sterling California plant at Stockton will be merged with the Food Machinery plant at San Jose, Calif.

The complete lines of pumps manufactured in the past by each of these organizations will be continued, and a new development in pump design is predicted for the near future.

IRVING "SUBWAY" GRATING

PERMITS AIR CIRCULATION

Proper ventilation assures healthier, more efficient workmen with increased production.

Irving Subway Grating is 80% open and admits maximum ventilation to stuffy sub-floor places, under stairs, etc.

Our long experience in this line is at your service.

Catalog on request.

IRVING SUBWAY GRATING CO., INC.
5008 27th Street
LONG ISLAND CITY, NEW YORK

Keep Cylinders at Work

THIS CYLINDER CONTAINS OXYGEN
THIS CYLIN ACETY CLOSE VALVE
Return Empties Promptly

Return empty cylinders promptly to assure an adequate supply of oxygen and acetylene for use in production for victory

Manual on Repair of War-Damaged Water Lines

An engineering manual, of 92 pages, on the repair of water lines damaged as a result of enemy action has just been published by Johns-Manville. It is designed to provide the detailed information needed by officials responsible for the maintenance of service in cities, military flying fields, bases and other critical areas vulnerable to bombing attacks.

Written especially for the thousands of users of Transite asbestos-cement pipe, the manual is divided into five parts; the first showing actual photographs of bomb damage; the second, typical damage suffered by pipe lines; the third, temporary and permanent repairs; the fourth, installation methods; and the fifth, a group of appendices treating of all the repair parts and tables referred to in the text. Typical experiences with asbestos-cement pipe in bombed British cities are also cited. The manual analyzes the types of damage most apt to result from direct bomb hits or artillery fire and suggests various temporary repairs designed to restore the damaged lines as quickly as possible, as well as permanent repairs. Included with the suggestions are detailed instructions, illustrated with photographs and diagrams.

The manual is offered without charge to waterworks operators, consulting engineers, army and navy engineers, plant engineers, and others who may need it. Copies of the book, DS Series 350, may be secured from Johns-Manville, 22 East 40th St., New York, N.Y.

Hard-Facing Rods

To serve companies unable to furnish high priority ratings, the Stoody Company has developed two new hard-facing alloys, Stoodite K and Stoody Self-Hardening K.

Stoodite K is a cast hard-facing rod consisting principally of molybdenum, tungsten, manganese, silicon, carbon, and iron. It is supplied both in bare form for oxyacetylene application and in coated form for D.C. electric application. It is available in five rod sizes: 1/8, 3/16, 1/4, 5/16, and 3/8 in., and in rod lengths of 14 in. Deposits of Stoodite K average 54–58 on the Rockwell C scale, depending on the type of parent metal and the method of application. Stoodite K is reported to form smooth, dense deposits free from porosity and shrinkage cracks. These deposits are said to withstand considerable pressure and impact if properly supported, and to offer excellent resistance to all types of abrasive wear. Stoodite K is recommended for hard-facing cement mill parts, brick and clay equipment, dredging and excavating equipment, etc.

Stoody Self-Hardening K is composed principally of molybdenum, manganese, silicon, carbon, vanadium, and iron, and is made in the form of tubes with the mixed alloys on the inside. This rod is supplied bare for oxyacetylene application and bare and coated for D.C. electric application. It is available in three rod sizes: 1/8, 3/16, and 1/4 in. Electric rods are 14 in. long; acetylene rods 28 in. Deposits of Stoody Self-Hardening K average 50–54 on the Rockwell C scale depending on the type of parent metal and the method of application. In addition to being highly resistant to wear, Stoody Self-Hardening K will also withstand considerable impact. It forms an excellent bond with manganese steel and can be used for hard-facing various types of manganese equipment. Deposits can be forged providing forging is done at red heat. Stoody Self-Hardening K is recommended for hard-facing tractor parts, sheepsfoot temper shoes, roll crushers, jaw crushers, gyratory crusher heads, conveyor buckets, dredge pump impellers, and other equipment subjected both to severe wear and impact.

Both Stoodite K and Stoody Self-Hardening K are available under the regular A-10, P-100 rating. Prices and specifications of the new rods may be obtained by writing to Air Reduction Sales Co., 60 East 42nd St., New York, N.Y.

★ ★

SABOTAGE

Can start on the drawing board

Inferior tracing cloth can sabotage your drawings just as effectively as enemy agents.

And it's so easy to be fooled! You'll find the lowest-grade tracing cloths clean and transparent when you buy them. But try making blue prints a year or two later. The cloth will be brittle – yellow — so opaque your drawings are blotted out.

Don't take this chance! We know how much time and sweat you put into a drawing. That's why Arkwright Tracing Cloths are highly transparent – and made to *stay* that way, to give your drawings *permanent* protection. That's why Arkwright has been recognized as the leading American manufacturer of tracing cloth for over twenty years. Next time *you* order, specify Arkwright. Arkwright Finishing Company, Providence, R. I.

Arkwright TRACING CLOTHS

Check Valves

The Williams Gauge Co., 2019 Pennsylvania Ave., Pittsburgh, Penna., announces an improved line of check valves, designated as the Williams-Hager Flanged Silent Check Valves. They are manufactured of bronze, cast iron, steel, stainless and monel metal, for pressures varying from 150 to 2500 lb, and sizes range from 1 to 20 in.

Williams-Hager Check Valves have but two parts subject to wear—the valve disk and seat. Both are easily removable and renewable, and the valve can be reseated without special tools. The spring ring is now built as an integral part of the body. These new valves may be used in all pump lines handling water, oil gas, acids, alkalies, and other fluids.

EVERYBODY
10%
EVERY PAYDAY

New Target for Industry:

More Dollars Per Man Per Month in the PAY-ROLL WAR SAVINGS PLAN

TO WIN THIS WAR, more and more billions are needed and needed fast—AT LEAST A BILLION DOLLARS A MONTH IN WAR BOND SALES ALONE!

This means a *minimum* of 10 percent of the gross pay roll invested in War Bonds in every plant, office, firm, and factory in the land.

Best and quickest way to raise this money—and at the same time to "brake" inflation—is by stepping up the Pay-Roll War Savings Plan, having every company offer every worker the chance to buy MORE BONDS.

Truly, in this War of Survival, VICTORY BEGINS AT THE PAY WINDOW.

If your firm has already installed the Pay-Roll War Savings Plan, *now is the time*—

1. To secure wider employee participation.
2. *To encourage employees to increase the amount of their allotments for Bonds, to an average of at least 10 percent of earnings—because "token" payments will not win this war any more than "token" resistance will keep the enemy from our shores, our homes.*

If your firm has not already installed the Pay-Roll War Savings Plan, *now is the time to do so.* For full details, plus samples of result-getting literature and promotional helps, write, wire, or phone: War Savings Staff, Section E, Treasury Department, 709 Twelfth Street NW., Washington, D. C.

U. S. War Savings Bonds

This space is a contribution to America's all-out war program by the American Society of Civil Engineers

Literature Available

Flocculators—The Rex Slo-Mixers, which offer the advantages of the Langlier Process of Multi-Stage flocculation, are described in Bulletin No. 389. Chain Belt Co., Sanitation Equipment Division, Milwaukee, Wis.

Paver—The 1942 Rex 34E two-compartment paver has a capacity of 34 cu ft of concrete, and automatically controls charging, discharging and mixing operations. The new low overall heighth, extended crawlers, and other features of this machine, are covered in Bulletin No. 407, Chain Belt Co., Milwaukee, Wis.

Portland Cement—"The Selective Use of Portland Cement" is the title of a 32-page book recently issued by the North American Cement Corporation, 285 Madison Ave., New York, N.Y. It covers types of cement, factors governing their selection for varous kinds of concrete work, and the North American products.

Pressure Recorder—The factual information contained in Foxboro's new Catalog 22-A is arranged so as to be of greatest time-saving convenience in selecting the pressure recorder best suited to particular needs. The Foxboro line is well illustrated and described, covering instruments for the measurement and recording of industrial pressures of all kinds, in ranges from 1 in. of water to 20,000 lbs. Other sections of the 32-page catalog describe methods of instrument mounting, types of cases available, integral electric signal systems, and accessory equipment. Foxboro Company, Foxboro, Mass.

Pumps—The features of Class GT Two-Stage Centrifugal Pumps are illustrated in a new 12-page, 2-color bulletin, Form No. 7167. This bulletin contains 28 photographs and cross-sectional views, extensive performance tables, and a comprehensive tabulation showing friction of water in various sizes of pipe. Ingersoll-Rand Company, 11 Broadway, New York, N.Y.

Switchboards—Modern switchboards, standardized in design for economy, yet custom-built to fit individual needs, are described in a new bulletin released by the Allis-Chalmers Manufacturing Co., Milwaukee, Wis. In the bulletin, B-6149, complete descriptions of vertical panels, duplex panels, benchboards, control desks and standard and special switchboards are offered.

Welding—Clarifying the proper welding process for a particular metal under various circumstances, a clearly written, conveniently grouped, 55-page book, "Welding Procedures," has been published by Air Reduction, 60 East 42nd St., New York, N.Y. Strong, fast, economical welds can be made only by a welder who has a complete knowledge of the factors involved. In addition to recommending process, the book recommends the best filler metals to be used for each process and describes specialized welding techniques not commonly known. In an appendix, data are given for the calculation of electrode and gas welding rod consumption for different types of welds; also comparative welding record sheets for tabulating data that will determine the best welding method for a particular job.

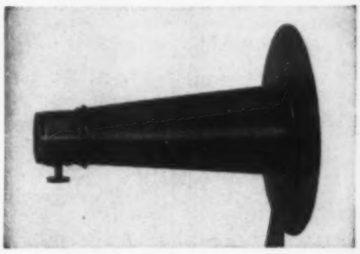
FOUNDATIONS
PRETEST UNDERPINNING
TUBA STEEL CYLINDERS
MASS CONCRETE CONSTRUCTION

DRILLED-IN CAISSONS
FOUNDATIONS
UNDERPINNING

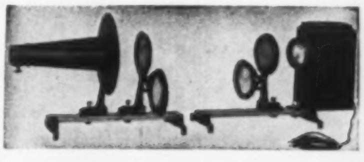
Send for catalogs descriptive of the latest foundation types and methods

SPENCER, WHITE & PRENTIS, INC.
10 EAST 40th ST. NEW YORK, N. Y.

The LENS
that assures PRECISION



For either qualitative or quantitative photo-elastic analysis, perfection in the projection lens system is of major importance.



In our new model polariscopes of 4¼" & 6¼" clear aperture, the parallel beam is collected by a rear element and condensed through a three component lens of the Cooke system. In the new larger units (8¼" and 10" aperture) a four component lens of the Omnar system is used. In both cases, *the image is sharp throughout the field, free of aberration, astigmatism, and distortion.*

Literature of new model polariscope now available.

POLARIZING INSTRUMENT CO.
630 Fifth Ave., New York, N. Y.

"COMMERCIAL"
METHODS

of tunneling—described in our booklet—every engineer interested in tunnel design should have it—Drop us a card.

COMMERCIAL
TUNNEL LINERS

THE COMMERCIAL SHEARING
AND STAMPING CO.
YOUNGSTOWN, OHIO

BUFF
TRADE MARK TRADE MARK

WORLD FAMOUS FOR 74 YEARS

Transits and Levels for Civil and Mining Engineers

Buff precision and design are continuously in the forefront.

ENGINEERS and contractors know that BUFF performance is accurate and sure—with adjustments that hold permanently.

THE BUFF "X" TELESCOPE

has the finest and highest definition and simplest lens system. It is useful when the light is dim.

Buff is used almost exclusively on the largest works in this country and Canada and Mexico and So. America.

Astronomical lens experts.

All makes—intelligently repaired and regraduated by Factory Experts.

The **finest work** at the **LOWEST POSSIBLE COST.** Reliability and **guaranteed work.** A special Souvenir Plumb Bob sent gratis to graduate Civil Engineers.

THE Greatest ACCURACY
THE Hardest BRONZE
THE Simplest DESIGN

Buff & Buff Company

Jamaica Plain, Massachusetts

It can be Your Library Department!

A trained staff and a fully equipped library would be a valuable addition to your company. The Service Bureau of the Engineering Societies Library can be that new department in your organization, yet more adequately manned and better equipped than any individual organization library could possibly be.

Use this service. Over 4,000 bibliographies on engineering subjects are on file. 150,000 engineering texts and files of every worthwhile periodical are available for further research to meet your specific needs. A letter, a telephone call or a telegram will place the Service Bureau at your service.

Use the service of *your* Engineering Library
The charges cover only the cost of the service and represent but a fraction of the value you will receive.

The Engineering Societies Library
29 West 39th Street, New York, N. Y.

can you fill these shoes?

There are many pairs of shoes to fill. Throughout industry, technically trained engineers of all kinds are needed to aid America win this war.

All civil engineers are in urgent demand—particularly squad leaders, structural designers and detailers, construction engineers and construction superintendents—men who are available for service at home or abroad.

If you can fill these shoes—if you want to work where you can best do your share in winning this war—register now. Write, placing your record with the nearest office of the Personnel Service, to-day. These are days of action—but the first move must be yours.

engineering societies PERSONNEL service

CHICAGO
211 W. Wacker Drive

NEW YORK
29 West 39th Street

DETROIT
100 Farnsworth Ave.

SAN FRANCISCO
57 Post Street

INDEX OF PRODUCTS

Acetylene
  Air Reduction Sales Co.

Acetylene Generators
  Air Reduction Sales Co.

Aerial Cableways and Tramways
  Wickwire Spencer Steel Co.

Airport Drainage
  Lock Joint Pipe Co.

Aluminum, Structural
  Aluminum Co. of America

Anchors for Fenders and Tunnel Forms
  Richmond Screw Anchor Co., Inc.

Asphalt
  Texas Co.

Asphalt Plank Bridge and Industrial Flooring
  Philip Carey Mfg. Co.

Bars, Aluminum
  Aluminum Co. of America

Bars, Iron and Steel
  Bethlehem Steel Co.

Barges, Steel
  American Bridge Co.

Belting, Metal, Conveyor
  Wickwire Spencer Steel Co.

Bins, Storage
  American Bridge Co.

Blower Pipe, Steel, for Ventilation Purposes
  Lock Joint Pipe Co.

Borings, Test
  MacArthur Concrete Pile Corp.
  Raymond Concrete Pile Co.
  Spencer, White & Prentis, Inc.

Bridges
  American Bridge Co.
  Bethlehem Steel Co.

Bridge Floors, Grating
  Irving Subway Grating Co., Inc.

Bridge Planks, Mineral Surfaced Asphalt
  Philip Carey Mfg. Co.

Buildings, Steel
  American Bridge Co.
  Bethlehem Steel Co.

Caissons
  Raymond Concrete Pile Co.
  Spencer, White & Prentis, Inc.

Cement, Portland
  Portland Cement Assn.

Cold Mix
  Texas Co.

Concrete Forms
  Douglas Fir Plywood Assn.

Concrete Form Anchors, Wood or Steel Forms, Light and Heavy Construction
  Richmond Screw Anchor Co., Inc.

Concrete Reinforcement
  Bethlehem Steel Co.
  Wickwire Spencer Steel Co.

Conductors, Lightning
  West Dodd Lightning Conductor Corp.

Contractors
  MacArthur Concrete Pile Corp.
  Raymond Concrete Pile Co.
  Spencer, White & Prentis, Inc.

Corrugated Sheets, Aluminum
  Aluminum Co. of America

Culverts, Cast Iron
  Cast Iron Pipe Research Assn.

Culverts, Reinforced Concrete
  Lock Joint Pipe Co.

Damp-Proof Compounds
  Philip Carey Mfg. Co.

Drafting Instruments and Materials
  Keuffel and Esser Co.

Drafting Materials
  Arkwright Finishing Co.

Drains, Reinforced Concrete
  Lock Joint Pipe Co.

Drawing Supplies
  Keuffel & Esser Co.
  Koh-I-Noor Pencil Co.

Dust Cure
  Texas Co.

Engineers
  MacArthur Concrete Pile Corp.
  Raymond Concrete Pile Co.
  Spencer, White & Prentis, Inc.

Engineering Instruments
  Keuffel & Esser Co.

Filler, Asphalt
  Philip Carey Mfg. Co.

Flooring, Aluminum
  Aluminum Co. of America

Flooring, Grating
  Irving Subway Grating Co., Inc.

Flux, Welding, Brazing, Etc.
  Air Reduction Sales Co.

Form Clamps, Concrete Wall Construction
  Richmond Screw Anchor Co., Inc.

Form Ties, Concrete Wall Construction
  Richmond Screw Anchor Co., Inc.

Foundations
  MacArthur Concrete Pile Corp.
  Raymond Concrete Pile Co.
  Spencer, White & Prentis, Inc.

Gauges, Acetylene, Oxygen
  Air Reduction Sales Co.

Grating, Steel Flooring
  Irving Subway Grating Co., Inc.

Hanging Devices for Concrete Forms
  Richmond Screw Anchor Co., Inc.

Heavy Stampings
  Commercial Shearing & Stamping Co.

Inks, Waterproof, Pigment, Drawing
  Keuffel & Esser Co.

Instruments
  Buff and Buff Co.
  Keuffel & Esser Co.
  Polarizing Instrument Co.

Joints, Expansion, Paving
  Philip Carey Mfg. Co.

Lettering Guides
  Keuffel & Esser Co.

Levels
  Buff & Buff Co.
  Keuffel & Esser Co.

Lightning Protection
  West Dodd Lightning Conductor Corp.

Liners, Tunnel
  Commercial Shearing & Stamping Co.

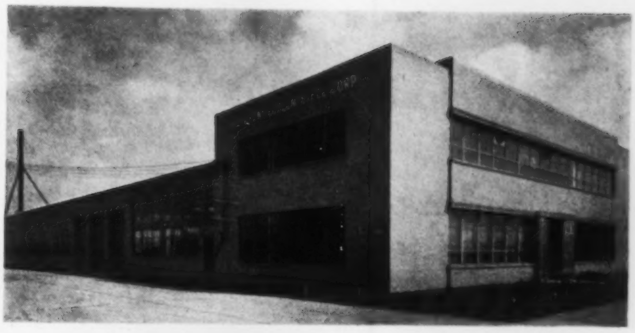
Machinery, Pipe Cutting and Bevelling
  Air Reduction Sales Co.

Measuring Tapes
  Keuffel & Esser Co.

Metal Connectors for Timber Joints
  Timber Engineering Co.

Metal Termite Shields
  Timber Engineering Co.

Continued on page 27



Carey
BUILT-UP ROOFS

Protecting Hundreds of Millions of Dollars Invested in Vital Plants and Equipment Throughout the Nation

CAREY Roofs make good. A study of the records of thousands of Carey Built-Up Roofs shows that many are still on the job after 25, 30 and even 35 years of service. In these critical war days, dependable roof protection is doubly important. Whether you require new roofs, or re-roofing jobs, it will be to your advantage to discuss your needs with a Carey representative. A nationwide organization of experienced roofing contractors is at your call. Write Dept. 81.

THE PHILIP CAREY MFG. COMPANY • Lockland, Cincinnati, Ohio
Dependable Products Since 1873
IN CANADA: THE PHILIP CAREY COMPANY, LTD. Office and Factory: LENNOXVILLE, P.Q.

WELL EQUIPPED

Every American soldier who "goes over" will be the best equipped fighting man in the world. Good equipment is one of the necessary essentials of the modern army and we are grateful that our boys will use the best.

Way back of the lines, in the drafting rooms of the plants producing war materials, experts have found that it also pays to provide workers with quality equipment. That is why KOH-I-NOOR is so often chosen by men who know pencils best. You too, can gain advantage in the use of KOH-I-NOOR Drawing Pencils; 17 degrees of unvarying, smooth, free-working perfection.

★

#1511 KOH-I-NOOR ARTIST PENCIL. Single end, hexagon yellow polished, gold stamped; stainless steel point of new design and construction, white plastic tip. A fine precision instrument. Made in 17 degrees: 6B to 9H. #2200 KOH-I-NOOR LEADS. For use with the #1511 Artist Pencil.

★

Send for Booklet No. 4

KOH-I-NOOR
PENCIL COMPANY INC.
373 FOURTH AVENUE • NEW YORK

ALBERT DORNE

Casualty—1,000 miles from the enemy

ALMOST as fatal as a bullet or a shell is the breakdown in the spirit of a sailor or a soldier.

Our men have the finest spirit in the world. But it must be maintained in the American way.

They must not be made to feel that they are mere automatons, fighting machines, as the armed forces of the dictators have been made to feel.

Life in our navy and army is hard. Discipline is tough. It must be. But there also must be moments when the sailor or soldier is treated as Mr. Somebody-or-other.

That's where the USO comes in. For the USO is the banding together of six great agencies to serve one great purpose—to see that our boys in the camps and naval stations have a place to go, to turn to, a "home away from home."

The duties of the USO have more than doubled during the year. It must serve millions more men. Its field of operations has been enlarged to include many parts of the world.

To carry on its important work, the USO must raise $32,000,000. It needs your contribution. No matter how small you make that contribution, the USO needs it. And it needs it *now.*

You are beset by requests for help on all sides. By all means, try to meet those requests. But among them, don't neglect the USO.

Send your contribution to your local USO committee, or to USO, National Headquarters, Empire State Building, New York.

Give to the USO

This space contributed by the American Society of Civil Engineers

INDEX OF PRODUCTS

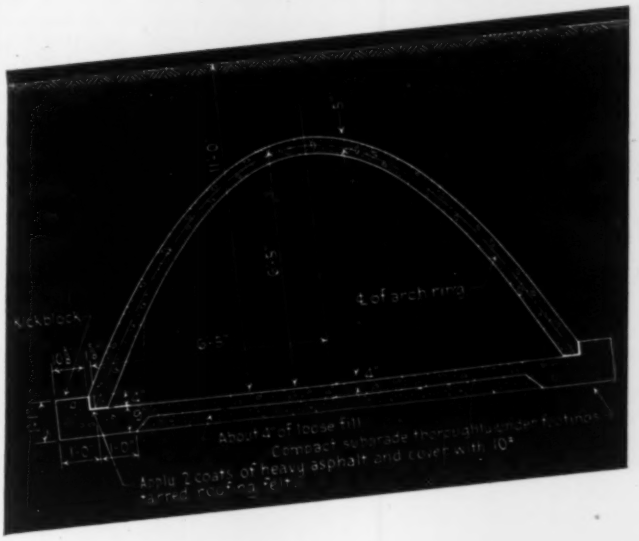
Continued from page 25

- Nickel and Its Alloys
  - International Nickel Co., Inc.
- Oxygen
  - Air Reduction Sales Co.
- Paint Pigment, Aluminum
  - Aluminum Co. of America
- Paper, Drawing and Tracing
  - Keuffel & Esser Co.
- Paving Materials
  - Portland Cement Assn.
  - Texas Co.
- Pencils
  - Koh-I-Noor Pencil Co.
- Penstocks
  - American Bridge Co.
  - Bethlehem Steel Co.
  - Lock Joint Pipe Co.
- Perforated Metal
  - Wickwire Spencer Steel Co.
- Piles, Concrete
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
- Piles, Steel Bearing
  - Bethlehem Steel Co.
- Piles, Steel Shell
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Piling, Steel Sheet
  - Bethlehem Steel Co.
- Pipe, Cast Iron
  - Cast Iron Pipe Research Assn.
- Pipe, Reinforced Concrete
  - Lock Joint Pipe Co.
- Pipe Coating, Asphalt
  - Texas Co.
- Pipe Fittings, Cast Iron
  - Cast Iron Pipe Research Assn.
- Plastic, Asphalt
  - Philip Carey Mfg. Co.
- Plate Work
  - American Bridge Co.
- Plywood
  - Douglas Fir Plywood Assn.
- Polariscope
  - Polarizing Instrument Co.
- Portland Cement
  - Portland Cement Assn.
- Pumps
  - Layne & Bowler, Inc.
- Regulators, Oxyacetylene
  - Air Reduction Sales Co.
- Reinforcement Fabric
  - Wickwire Spencer Steel Co.
- Road Oils
  - Texas Co.
- Road Surfacing Materials
  - Texas Co.
- Rods, Wire
  - Wickwire Spencer Steel Co.
- Roofing Materials
  - Philip Carey Mfg. Co.
  - Texas Co.
- Rope, Wire
  - Bethlehem Steel Co.
  - Wickwire Spencer Steel Co.
- Screens, Woven Wire
  - Wickwire Spencer Steel Co.
- Sewer Pipe, Reinforced Concrete
  - Lock Joint Pipe Co.
- Sheathing, Wood
  - Douglas Fir Plywood Assn.
- Sheets, Aluminum
  - Aluminum Co. of America
- Sheets, Iron and Steel
  - Bethlehem Steel Co.
- Shoring
  - Spencer, White & Prentis, Inc.
- Springs, Extension, Compression Torsion or Flat
  - Wickwire Spencer Steel Co.
- Stacks
  - American Bridge Co.
  - Bethlehem Steel Co.
- Static Control Equipment
  - West Dodd Lightning Conductor Corp.
- Steel, Structural
  - Bethlehem Steel Co.
- Steps, Safety Grating
  - Irving Subway Grating Co., Inc.
- Strands, Wire
  - Wickwire Spencer Steel Co.
- Subaqueous Intakes and Outfalls, Reinforced Concrete
  - Lock Joint Pipe Co.
- Surveying Instruments
  - Buff and Buff Co.
  - Keuffel & Esser Co.
- Tanks
  - American Bridge Co.
  - Bethlehem Steel Co.
- Termite Shields
  - Timber Engineering Co.
- Timber Joint Connectors
  - Timber Engineering Co.
- Torches, Welding and Cutting
  - Air Reduction Sales Co.
- Towers, Steel
  - American Bridge Co.
  - Bethlehem Steel Co.
- Tracing Cloth
  - Arkwright Finishing Co.
- Track, Industrial and Portable
  - Bethlehem Steel Co.
- Transits
  - Buff and Buff Co.
  - Keuffel & Esser Co.
- Tunnel Liners
  - Commercial Shearing & Stamping Co.
- Turntables
  - American Bridge Co.
- Tying Devices for Concrete Forms
  - Richmond Screw Anchor Co., Inc.
- Underpinning
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Water Supply Equipment
  - Layne & Bowler, Inc.
- Water Supply Pipe, Reinforced Concrete
  - Lock Joint Pipe Co.
- Waterproofings, Membrane
  - Philip Carey Mfg. Co.
- Welding and Cutting Apparatus
  - Air Reduction Sales Co.
- Well Water Systems
  - Layne & Bowler, Inc.
- Wire, Flat, Round, Square
  - Wickwire Spencer Steel Co.
- Wire Cloth
  - Wickwire Spencer Steel Co.
- Wire Rope and Strands
  - Bethlehem Steel Co.
  - Wickwire Spencer Steel Co.

Alphabetical Index to Advertisers shown on page 28

The Society reserves the privilege of rejecting advertisements inconsistent with its ethical procedure

New design data on
CONCRETE CULVERTS
without reinforcing steel


11'-0"
6'-5"
℄ of arch ring
Kickblock
1'-0"
1'-0"
About 4" of loose fill
Compact subgrade thoroughly under footings
Apply 2 coats of heavy asphalt and cover with 10" tarred roofing felt

To aid in the war program, the Portland Cement Association has prepared data for rapidly designing concrete culverts *entirely without reinforcing steel.*

New Information Sheet, *"Plain Concrete Culverts,"* shows how to design parabolic two-hinged arches—ideal culvert type for saving steel, with least amount of concrete, too. The simple design method given is applicable to all local conditions.

Besides conserving steel in culverts and many other wartime structures, concrete can often save transportation, since the bulk of concrete material is usually found locally. Our purpose is to help concrete give maximum service in meeting these vital requirements while providing the necessary strength, durability and fire resistance.

Technical assistance is available to designers and builders on all types of war construction.

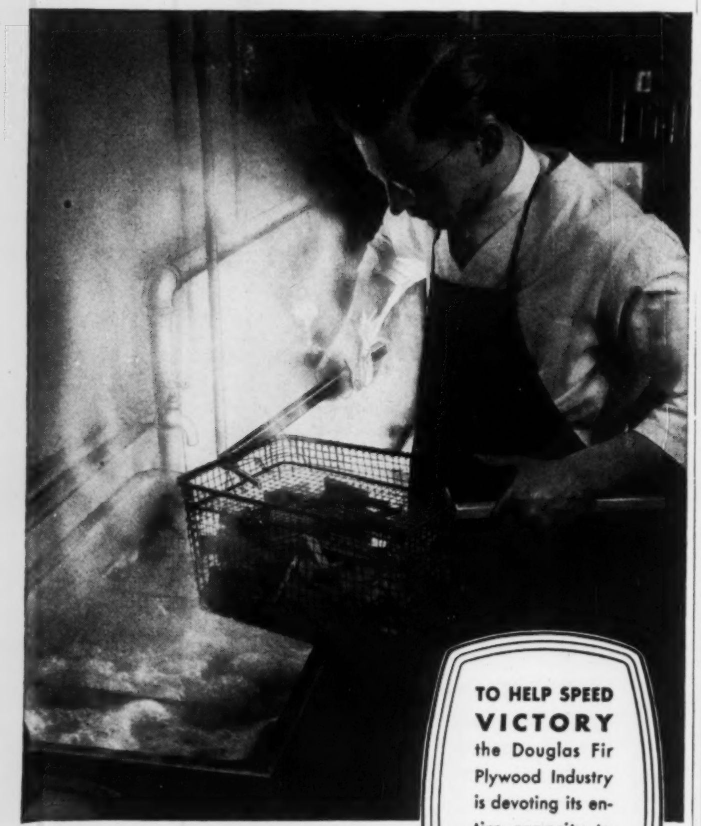
PORTLAND CEMENT ASSOCIATION
Dept. 7-13, 33 W. Grand Ave., Chicago, Ill.
Please send me new Information Sheet,
"Plain Concrete Culverts"

Name______________________________
Address____________________________
City__________________ State__________

How long would you like your Plywood boiled?

● The answer is *long enough to prove that continued boiling would still have no effect on the phenolic-resin bond between the plies.* You see, boiling is just one of a series of tests to which Exterior-type Douglas Fir Plywood is constantly subjected. We want to make sure that Exterior Plywood will withstand *all* water and weather conditions. We want to determine if there are possible ways of improving its performance.

These tests—important as they are—constitute but a small part of our extensive research program. We are seeking the answers to scores of problems *today* so that *tomorrow,* when all types and grades of Douglas Fir Plywood are again available everywhere, *this engineered lumber will be more useful to you than ever before.* Douglas Fir Plywood Assn., Tacoma, Wash.



TO HELP SPEED VICTORY the Douglas Fir Plywood Industry is devoting its entire capacity to war production. We know this program has your approval.

DOUGLAS FIR PLYWOOD
Real Lumber
MADE LARGER, LIGHTER SPLIT-PROOF STRONGER

REMEMBER — there is a grade or type of Douglas Fir Plywood made for every purpose. Every genuine panel bears one of these "grade trade-marks":

PLYWALL—wallboard grade
EXT-DFPA—waterproof exterior type
PLYSCORD—utility sheathing grade
PLYPANEL—cabinet grade
PLYFORM—concrete form grade

"A PRODUCT OF AMERICA'S ETERNALLY REPLENISHING FORESTS"

INDEX TO ADVERTISERS

ALPHABETICAL

Air Reduction Sales Company 4
Aluminum Company of America 13
American Bridge Company 11
(United States Steel Corporation subsidiary)
Arkwright Finishing Company 21
Bethlehem Steel Company 17
Buff & Buff Company 24
Philip Carey Manufacturing Company . . 25
Cast Iron Pipe Research Association 9
Commercial Shearing & Stamping Company 23
Douglas Fir Plywood Association 28
International Nickel Company, Inc. . . . 1
Irving Subway Grating Co., Inc. 20
Keuffel & Esser Company 8
Koh-I-Noor Pencil Company 25
Layne & Bowler, Inc. 20
Lock Joint Pipe Co. 2
MacArthur Concrete Pile Corporation . . 6
Polarizing Instrument Company 23
Portland Cement Association 27
Raymond Concrete Pile Company . *Second Cover*
Richmond Screw Anchor Co., Inc. . . *Back Cover*
Spencer, White & Prentis, Inc. 23
Texas Company . . . . *Third Cover*
Timber Engineering Company 3
U. S. Steel Corporation Subsidiary 11
West Dodd Lightning Conductor Corporation 19
Wickwire Spencer Steel Company 15

Index to Products Shown on Pages 25 and 27

As the result of many years' close co-operation with paint and varnish manufacturers, and with government and industrial engineers, Bakelite Laboratories have helped to develop a wide variety of protective finishes especially suited to sewage disposal plants and other public service equipment. Such coatings, fortified with BAKELITE resins, may be formulated to withstand not only long periods of immersion and weathering but also abrasion, excessive heat and cold, and the corrosive action of most chemical liquids and fumes.

Information on existing surface coating systems based on BAKELITE resins, or assistance in developing coatings to meet special conditions, may be obtained by writing to Department 4.

BAKELITE CORPORATION, 30 EAST 42ND ST., NEW YORK, N. Y.
Unit of Union Carbide and Carbon Corporation

UCC

BAKELITE
TRADE MARKS
The word "Bakelite" and the identifying products Ⓑ Symbol are registered trade-marks of Bakelite Corporation
SYNTHETIC RESINS

Flexibility to Withstand Expansion and Contraction

The steel guard rails of aeration tank walks are protected by anti-corrosive primers and finishing coats based on BAKELITE resins. These durable coatings retain their flexibility over long periods — in this instance more than four years — to withstand continuous expansion and contraction of the underlying metal.

Unusual Durability

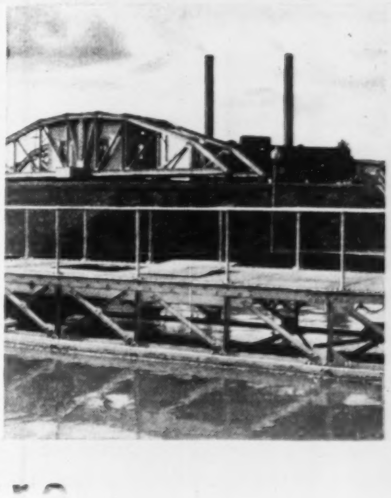
Primers and aluminum-pigmented top coats, based on BAKELITE resins, and applied to the superstructures of primary settling tanks, have demonstrated unusual durability for a period of four to five years. Repainting was accomplished by spot cleaning and priming, followed by one coat of aluminum paint.

Resistance to Constant Immersion and Erosion

Underwater steel structures, containing activated sludge, survive five years' constant immersion and erosion when surface-protected by an anti-corrosive primer, formulated with a BAKELITE resin, and two top coats of de-emulsified asphalt emulsion.

Resistance to Weathering

Phenolic resin primers and aluminum top coats combine to provide a remarkably durable paint system for superstructures of primary settling tanks, digestion tanks, and other equipment above water. They retain their bright, corrosion-resistant finish despite years of exposure to sunlight and moisture.



Engineering Societies Personnel Service, Inc.

New York	Chicago	Detroit	San Francisco	Boston
31 W. 39th St.	211 W. Wacker Dr.	100 Farnsworth Ave.	57 Post St.	4 Park Street

The items listed below have been furnished by the Engineering Societies Personnel Service, Inc., which is under the joint management of the Four Founder Societies. This service is available to members and is operated on a cooperative, non-profit basis. In applying for positions advertised by the Service the applicant agrees, if actually placed in a position through the Service as a result of these advertisements, to pay a placement fee in accordance with the rates as listed by the Service. These rates have been established in order to maintain an efficient, non-profit personnel service and are available upon request. This also applies to registrants whose notices are placed in these columns. All replies should be addressed to the key numbers indicated and mailed to the New York Office.

A weekly bulletin of engineering positions open is available to members of the cooperating societies at a subscription of $3 per quarter or $10 per annum, payable in advance.

Men Available

Stress Analyst; Jun. Am. Soc. C.E.; Mem. A.A.A.S., Am. Math. Soc.; age 31; married; B.S.C.E., M.S.T., A.M., C.E. degrees, University of Illinois; 7 years stress analysis in office design work for U.S. Engineering Department; desires position offering opportunity for research in application of advanced mathematics to civil or aeronautical engineering design. C-930.

Construction Executive; Assoc. M. Am. Soc. C.E.; civil engineer, now operating own business, seeks responsible position as Project Manager, General Superintendent, or Chief Engineer. Exceptionally well-qualified, accustomed to contacting and handling clients; coordinator and organizer, aptitude for getting things done; 25 years' experience on industrial, commercial, boiler plant, and incinerator construction. C-931.

Civil Engineer; M. Am. Soc. C.E.; B.S.C.E.; LL.B.; retiring from Government service; 34 years' experience on railroad location, construction, and valuation; highway planning and mapping; position desired as assistant or associate professor of subjects related to those of experience; location, East preferred. C-932.

Graduate Civil Engineer; Jun. Am. Soc. C.E.; 28, single; 3 years laying out, constructing, inspecting water channels and earth structures, drafting, computing, drawing plans; 2 years physical testing materials; one year testing personnel for special aptitudes. Desires direction of physical testing laboratory, including experimental work or varied field and office engineering supervision and planning. C-933.

Positions Available

Inspector, civil engineer, with a knowledge of transit, level, grading, and pile-driving work desirable. Salary, $2,760 a year. Apply by letter giving references. Location, Virginia. W-42.

Assistant Construction Engineers, 30–35, graduates, who have had considerable experience in highway construction, drainage, excavation, etc. Will be required to assist construction superintendent, make reports, etc. Duration, 6 to 10 months. Salary, $6,000 a year. Location, South America. W-291.

Instructor for civil engineering department. Should be able to teach photogrammetry and surveying and handle the mechanics of materials and hydraulic laboratory work. Permanent. Salary, $2,100–$2,800 a year, depending on experience. Location, New York, N.Y. W-336.

Sales Engineer and Service Man to represent explosives company in the Pennsylvania cement field. Recent graduate will be considered although applicant must be free of draft call. Salary, $2,400 a year or more, plus traveling expenses and car. W-353.

Hydraulic or Soil Mechanics Engineers who are not immediately subject to the draft. Hydraulics division engaged in the study of designs for power dams, waterways, and harbor and navy yard facilities. Soil mechanics division is carring on laboratory and field investigations of foundations for dams, levees, airports, and soil stabilization. Salaries: Junior Engineer, graduate or assistant engineer, graduate plus several years' experience, $2,000–$2,600 a year. Location, South. W-443.

Instructor to teach hydraulics, water supply, sewerage and sewage disposal, community planning, and materials testing laboratory. Apply by letter giving full particulars including salary required. Location, Texas. W-649.

Civil Engineers qualified to supervise survey and topographical work and to make soil boring tests and load tests. Should have had experience in heavy industrial construction, including foundations, buildings, and alinement of heavy equipment. Location, northern South America. W-687.

Office Engineer, mechanical or civil, preferably with some shipyard experience, to plan and expedite work and materials. Will act as assistant to general manager of shipyards. Salary, $3,600–$4,800 a year. Location, East. W-694.

Office Engineer to be in charge of heavy construction and some design work; roads, railroads, excavations. Salary, $7,500 a year. Location, Cuba. W-758.

Mechanical or Civil Engineer, young, who has had some experience on the construction or maintenance of petroleum refineries. Permanent. Salary open. Location, New York, N. Y. W-764.

Surveyors to act as chief of party on large construction project. Duration at least a year. Must assume single status. Salary, $4,200–$4,800 a year. Location, foreign. W-773.

Supervising Engineers, civil, for general inspection of construction projects, primarily industrial buildings. Will also approve invoices and payrolls. Salary, $3,800–$4,200 a year. Location, East. W-787.

Surveyor who has had some construction layout experience. Salary, $3,120 a year. Location, New Jersey. W-790.

Engineer capable of supervising a field force of about seven inspectors on building construction, including inspection of all necessary roads and exterior utilities to serve these buildings. Must be capable of supervising a small office force. Should also be able to supervise contracts, interpret plans and specifications, negotiate with contractors, and supervise partial and final payments to lump sum contractors. Salary, $3,200 a year, plus overtime. Location, New Jersey. W-791.

Instructor, graduate in civil or sanitary engineering with one or more laboratory courses in general or sanitary bacteriology. Will teach laboratory courses in sanitary bacteriology and lecture courses in water supply, sewerage, sanitation, and related subjects. Prefer someone who has had graduate or research work, practical experience, and teaching experience in sanitary or public health engineering. Teaching load moderate. Salary, $1,800–$2,400 for 9 months' teaching. Permanent with chance for advancement. Apply by letter giving complete details. Location, Middle West. W-796.

Recent Graduate Civil Engineers for use in field construction and general layout work. Will take a few with construction experience. Salary, $2,080–$3,380 a year. Location, South. W-812.

Instructor in Civil Engineering, young, prefer man who has had extracurricular work and about a year of teaching experience. Permanent. Salary, $1,800 a year. Location, West. W-817.

Sales Engineer, under 40, with sales experience in the field of building materials or power products. Should have had an engineering or architectural education. Ambitions should lie in the direction of sales management, but applicant should expect initial job to be of sales or promotional type. Location, Ohio. W-835.

Assistant Professor, young, married, to teach elementary hydraulics, hydraulic laboratory, water supply engineering, municipal sanitation, concrete technology, and materials testing. Prefer both practical and teaching experience and an advanced degree. Opportunity for additional income by teaching defense courses. Starts September 15. Location, New York State. W-841.

Construction Superintendents, three. One would supervise construction of process equipment; second would supervise and direct forces in underground work, preferably being experienced in underground and drainage work, and also water works systems; the third should have considerable experience in general building. Location, Ohio. W-851.

Surveyor who has had considerable experience in the field and who is capable of accepting responsibility of line grade and layout for a water supply system. Location, East. W-854.

Instructor, young; graduate civil engineer preferred, but will consider graduate mechanical engineer if he has had some surveying course. First semester applicant will teach mechanical drawing, elementary survey, theoretical mechanics; second semester, descriptive geometry, topographic surveying, theoretical mechanics. Salary, $1,800 a year. Permanent. Location, New York State. W-864.

RECENT BOOKS

New books of interest to Civil Engineers donated by the publishers and filed in the Engineering Societies Library, or in the Society's Reading Room, will be found listed here. The notes regarding the books are taken from the books themselves and are edited by members of the staff of the Society or of the Library. Those books which are in the Library may be borrowed by mail by Society members for a small handling charge.

Analysis of Rigid Frames (An Application of Slope Deflection). By A. Amirikian. Government Printing Office, Washington, 1942. 396 pp., diagrs., charts, 9 × 6 in., cloth, $1.

For convenient study the book is divided into four parts: Part I deals with the fundamentals of elastic deformation and the principles of slope deflection; Part II contains the analysis of continuous beams and simple framing, including a simplified method of solution of simultaneous equations; Part III presents a broad and original application of slope deflection to the analysis of frames involving sidesway; and Part IV consists of a detailed discussion of some factors of analysis of minor importance in design.

Physics for Engineers. By Sir A. Fleming. Chemical Publishing Co., Brooklyn (N.Y.), 1942. 232 pp., illus., diagrs., charts, tables, $9 \times 5\frac{1}{2}$ in., fabrikoid, $3.

Present-day knowledge in the realm of physics is summarized with special reference to the requirements of practical engineers. The book starts with the fundamental physical units and ends with atomic transformations, having dealt with various aspects of energy, electricity, electronic emissions, radiation, optics, and sound.

Tables of Physical and Chemical Constants and Some Mathematical Functions, 9 ed. By G. W. C. Kaye and T. H. Laby. Longmans, Green & Co., New York, London, Toronto, 1941. 191 pp., tables, $10 \times 6\frac{1}{2}$ in., cloth, $5.

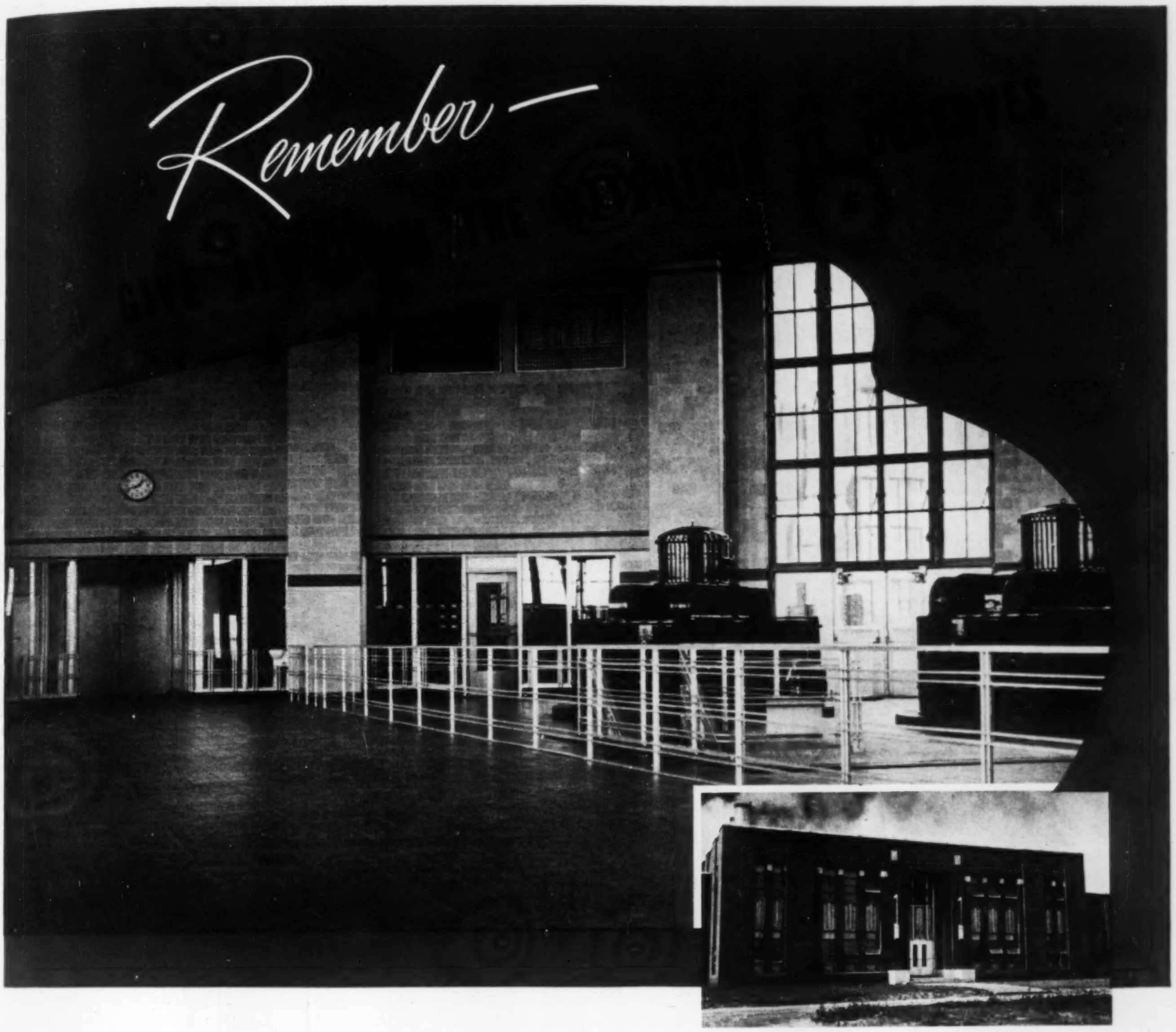
This well-known publication aims to fill the need for an up-to-date, moderately priced collection of physical and chemical tables which will meet the usual needs in teaching and laboratory work. The new edition has been thoroughly revised and expanded.

What Steel Shall I Use? By G. T. Williams. American Society for Metals, Cleveland, Ohio, 1941. 213 pp., illus., diagrs., charts, tables, 9 × 6 in., cloth, $3.50.

The many factors which bear upon the selection of the best available steel for any given purpose are briefly and clearly presented. These factors include physical properties, metallurgical aspects, availability of proper treatment, considerations in fabrication, and economic aspects. Suggestions for further reading accompany each chapter.

Your Career in Engineering. By Norman V. Carlisle. E. P. Dutton and Company, Inc., New York, N.Y., 1942. 253 pp., illus., $8 \times 5\frac{1}{2}$ in., cloth, $2.50.

To place before the young reader the increasing scope of engineering, and to demonstrate the work of the engineer, the author shows the development of many and diverse engineering projects. The volume explains how to study for engineering, the responsibilities of the profession, the remuneration that may be expected, and the opportunities and difficulties confronting a young man entering this field.



The decorative Aluminum in your water treatment or sewage disposal plant simplifies your maintenance work. It is easy to keep bright and shining, offering visible proof to visitors that you're very much on-the-job.

Hand and stair rails, window sills, light reflectors, equipment and instrument housings, and similar parts, often have an Alumilite finish (process patented). An occasional dusting with a dry cloth, or washing with mild soap and water, may be all they need to maintain their original brightness. The booklet, "Instructions for the Protection and Maintenance of Alumilite Finishes and Alzak Reflectors," contains much helpful guidance.

The Aluminum Alloy equipment in your plant, installed primarily as a barrier against corrosion, also helps make upkeep easier. Of course, Aluminum window frames, skylights, coping, spandrels, air ducts, and the like, should be cleaned occasionally. This gets rid of moisture-holding pockets of dust and debris that accumulate in corners, and which might cause trouble.

Are you wondering how to get maximum life from the irreplaceable Aluminum Alloys throughout your plant? Alcoa engineers are always ready to help you get the answer. Write Aluminum Company of America, 2127 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA ALUMINUM

CURRENT PERIODICAL LITERATURE

Abstracts of Articles on Civil Engineering Subjects from Publications (Except Those of the American Society of Civil Engineers) in this Country and Foreign Lands

Selected items for the current Civil Engineering Group of the Engineering Index Service, 29 West 39th Street, New York, N.Y. Every article indexed is on file in The Engineering Societies Library, one of the leading technical libraries of the world. Some 2,000 technical publications from 40 countries in 20 languages are received by the Library and are read, abstracted, and indexed by trained engineers. With the information given in the items which follow, you may obtain the article from your own file, from your local library, direct from the publisher, or they may be borrowed from the Engineering Societies Library. Photoprints will be supplied by this library at the cost of reproduction, 25 cents per page to members of the Founder Societies (30 cents to all others), plus postage, or technical translations of the complete text may be obtained at cost.

BRIDGES

Concrete, India. Bridge Over Tapti River, India, G. K. Patil and N. K. Patel. *Concrete & Constr. Eng.*, vol. 37, no. 4, Apr. 1942, pp. 135–138. Details of design and construction of reinforced concrete bridge over 400 yd long; bridge consists of six units, each unit having central suspended span of 102 ft and cantilevers 51 ft in length at both ends. From *Indian Concrete J.*

Concrete, India. Design and Construction of Anderson Bridge, J. Chambers. *Instn. Engrs., India—J.*, vol. 21, no. 2, Aug. 1941, pp. 263–315. Description of largest single span reinforced concrete bridge constructed in India across Teesta River; bridge has arch of 292 ft clear span and rise of 50 ft; details and drawings of bridge dimensions and construction procedure.

Concrete Arch, Switzerland. Die Klosterbruecke ueber die Toess bei Winterthur, E. Rathgeb. *Schweizerische Bauzeitung*, vol. 119, no. 12, Mar. 21, 1942, pp. 133–135. Illustrated description of Kloster Bridge over Toess River near Winterthur; bridge is of concrete double-hinged arch construction; data on stress calculation, construction methods, and costs.

Highway, Maintenance and Repair. Major Bridge Replacement Under Traffic, A. B. Cohen. *Eng. News-Rec.*, vol. 128, no. 23, June 4, 1942, pp. 926–929. Problems in replacing existing 3-span, through-truss highway bridge over Lackawanna River and two railroads at Scranton, Pa.; plan evolved kept one-half of old structure in service while other half was removed and rebuilt; traffic was then shifted to new construction to permit reconstruction of second half of bridge.

Plate Girder, Switzerland. Die neue Eisenbahnbruecke bei der Seestrassen-Unterfuehrung in Zuerich-Wollishofen, F. Stuessi. *Schweizerische Bauzeitung*, vol. 118, no. 25, Dec. 20, 1941, pp. 295–299. New railroad bridge at Seestrasse underpass in Zurich-Wollishofen; illustrated description; reinforced concrete bridge trough is supported by broad-flanged concrete-encased intermediate girders which, together with concrete and additional reinforcement, form sharply inclined plate of 36-cm thickness; advantages of steep incline pointed out; two main girders are riveted continuous plate.

Railroad, California. Canvas Cover Permits Wet Weather Paving on Concrete Deck of Pit River Bridge. *Eng. News-Rec.* (News Issue), vol. 128, no. 6, Feb. 5, 1942, p. 11. Pit River Bridge has overall of 3,588 ft, including short highway approach viaducts on either side, and rises to height of about 500 ft above waters of Pit River; span will carry two railroad tracks on lower deck and 4-lane section of U.S. Highway 99 on upper; article describes tarpaulins used to protect workers and project during bad weather.

Railroad, Failure. "Soo" Bridge Collapse. *Engineering*, vol. 153, no. 3965, Jan. 9, 1942, pp. 23–24. Account of collapse on Oct. 7, 1941, of leaf of bascule bridge over Sault Ste. Marie ship canal ("Soo" Canal), Michigan; description of bridge built in 1914; reason for failure appears to be somewhat obscure; additional security has been provided by fitting bolt locks to leaves. See also Engineering Index 1941, p. 161.

Railroad, Maintenance and Repair. Beating Bridge Burn-out on B. & M. *Ry. Eng. & Maintenance*, vol. 38, no. 6, June 1942, pp. 408–410. Description of quick organization of emergency force and manner of reconstruction of important drawbridge on Boston & Maine Railroad damaged by fire.

Railroad, Standards. Standard Railway Bridge Spans. *Engineer*, vol. 173, no. 4490, Jan. 30, 1942, p. 102. In order to facilitate reconstruction of damaged bridges, British railway companies have designed standard spans which can readily be adapted for any normal sites where openings to be bridged over are between 40 and 80 ft; brief illustrated description.

Steel Truss, Chester, Ill. Spanning Mississippi at Chester, Ill. *Eng. News-Rec.* (News Issue), vol. 128, no. 12, Mar. 19, 1942, p. 6. Mid-river pier and Missouri pier supporting main trusses were sunk with pneumatic caissons and built on rock 100 and 110 ft below water, respectively; main pier on Illinois side was constructed by means of open cofferdam and rests on rock about 30 ft below surface; all piers for Illinois approach are carried to rock, but those for Missouri approach rest on timber piling; superstructure erection.

Wooden, Tuscaloosa, Ala. Timber Bridge Conserves Steel for War Use. *Construction Methods*, vol. 24, no. 4, Apr. 1942, pp. 55 and 119. Channel span of Grabbe Road bridge consists of two identical pairs of 90-ft half-through trusses 15 ft deep fabricated with split-ring timber connectors and shear plates; floor trusses of bridge have 8 by 12-in. chords, 6 by 8-in. verticals, and 2 by 12-in. diagonals in pairs; lateral bracing is of K type; stringers are 6 by 16-in., 15-ft span, spaced 30 in. on centers; bridge roadway has 24-ft width, and consists of 2 by 2-in. laminated gum surface flooring.

BUILDINGS

Concrete Construction. Concreting 100-Acre Office Building. *Eng. News-Rec.*, vol. 128, no. 23, June 4, 1942, pp. 920–924. Construction of War Department Office Building in Arlington, Va., requires placing of 450,000 cu yd of concrete; article describes concrete construction operations which feature transit mixing and delivery by tower hoist and chute to concrete buggies for final placing.

Earthquake Resistance. Earthquake Stresses in Frame Structures, R. E. Glover. *Am. Concrete Inst—J.*, vol. 13, no. 5, Apr. 1942, pp. 453–470. Way of utilizing instrumental records obtained from past quakes to evaluate earthquake-resistant qualities of proposed or existing structures is developed; effect of damping may be included, and method of using torsion pendulum to obtain certain important results is described; condition under which earthquake allowance in form of transverse load proportional to weight may be safely used is identified.

Engineers and Architects. Engineering and Architecture, H. S. Goodhart-Rendel. *Instn. Civ. Engrs.—J.*, no. 4, Feb. 1942, pp. 334–348. Brief historical review of responsibilities of architects and engineers in building design; critical discussion concerning lack of cooperation that has shown itself in so-called building monstrosities since development of separate branches of engineering and architecture; outline of ideal cooperative steps which would bring about satisfactory building design.

Office Buildings, Fire Prevention. Temporary But Safe, C. A. Peters. *Nat. Safety News*, vol. 45, no. 1, Jan. 1942, pp. 22–23. Temporary buildings, being erected in Washington, D.C., to accommodate enormous influx of government office workers, will have frame structure, but exterior walls will be faced with fire-resistant asbestos board to make building fireproof; additional fire precautions noted.

Office Buildings, Washington, D.C. Speed and Conservation Are Paramount on Washington's Temporary Office Buildings. *Eng. News-Rec.* (News Issue), vol. 128, no. 18, Apr. 30, 1942, pp. 8–9. Buildings are built with expectation that they will be torn down immediately after war; structures are all two stories high; of frame construction, covered with asbestos board, they follow standard plan of "head house" $47\frac{1}{2}$ ft wide, with varying number of wings, each $47\frac{1}{2}$ ft wide extending to desired depth; light-court separates wings.

CITY AND REGIONAL PLANNING

Post-War. Post-War Planning, G. V. Harrup. *Elec. Eng.*, vol. 61, no. 5, May 1942, pp. 274–277. Letter to editor giving results of some preliminary investigations of post-war planning made in Great Britain; problems of transition period; methods of study; internal organization problems; problems of reorganization; national planning problems.

Post-War. Post-War Planning, R. Nicholas. *Surveyor*, vol. 101, no. 2625, May 15, 1942, pp. 163–164. Technical considerations upon which planning scheme should be based; main roads, secondary and minor communications, air, rail, waterway, and highway-transport systems; location of industry; population distribution; parks; zoning for industrial uses; provision of utility services; and agricultural developments.

Switzerland. Rapport de la Commission d'etude des problemes techniques genevois. *Bul. Technique de la Suisse Romande*, vol. 68, nos. 6 and 7, Mar. 21, 1942, pp. 66–69, and Apr. 4, pp. 77–82. Report of Geneva Committee for study of engineering problems; historical review, including prehistoric period; Gallic-Roman epoch; Middle Ages; period of Reformation, etc.; present-day problems of municipal engineering and regional planning; main roads converging on Geneva; zoning; public buildings.

CONCRETE

Air-Raid Shelters. Air-Raid Shelter for Fifty People. *Eng. News-Rec.*, vol. 128, no. 23, June 4, 1942, pp. 904–905. Shelter to accommodate fifty people built at Windham Center, Conn.; walls and roof are 24 in. thick with double reinforcing; floor is 12-in. slab with $^1/_2$-in. bars on 12-in. centers each way; structure is designed for earthfill covering surmounted by burster slab 3 ft thick.

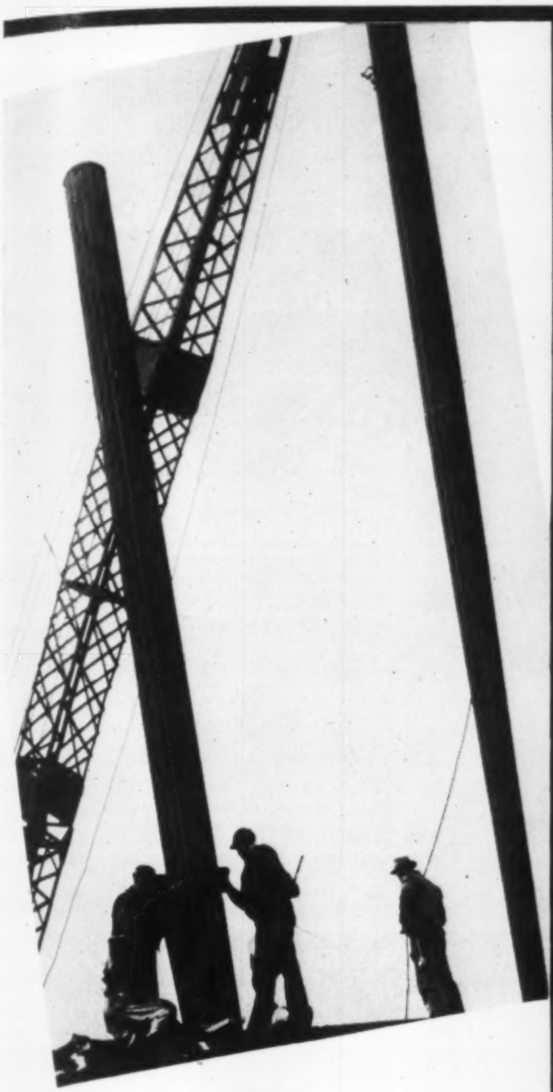
Construction. Job Problems and Practice. *Am. Concrete Inst.—J.*, vol. 13, no. 6, June 1942, pp. 521–532. Following problems considered: Concrete Curing Compound—Made on Job, P. A. Jones; Concrete of Future, R. E. Davis; Placing Cold Concrete in Hot Weather, R. W. Carlson; Evaluating "n," A. N. Talbot; Determining Reinforcement in Hardened Concrete, H. L. Flodin; Formula and Diagram for Spacing of Stirrups, E. Zbinden; Design of Stirrups.

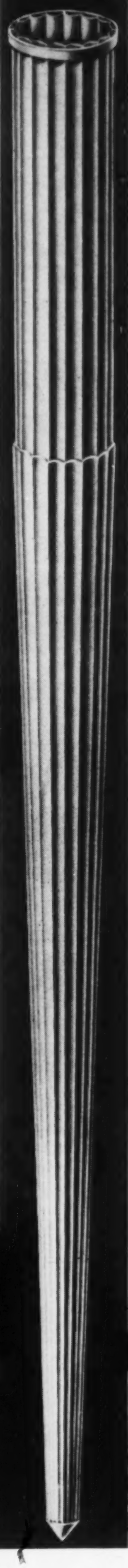
Construction, Pump Placing. Concrete Pumped Downhill for Dam, C. M. Glines. *Eng. News-Rec.*, vol. 128, no. 21, May 21, 1942, pp. 863–865. At York, Pa., pump and pipeline system was used to distribute 40,000 yd of concrete required at widely separated points for control works of earth and rock Indian Rock Dam; moderately dry concrete was dropped 70 ft in pipeline without difficulty, and it was pumped as much as 950 ft.

Construction. Surface Finishing of Concrete Structures, N. Davey. *Instn. Civ. Engrs.—J.*, no. 6, Apr. 1942, pp. 183–205, (discussion) 206–224. Emphasis on importance of surface finish of concrete; reference to conclusions drawn from investigations carried out by Building Research Station, in collaboration with Cement and Concrete Assn., and such factors as control of mix, design of formwork, method of placing, construction joints, types of finish, conditions of exposure, and general architectural considerations.

Crushed Stone Industry, Research. And Now, What of Research, A. T. Goldbeck. *Crushed Stone J.*, vol. 17, no. 2, Mar.-Apr. 1942, pp. 10–14. Some defense and allied problems in which National Crushed Stone Association's research staff has already participated are outlined as follows: Airport runway design; concrete for drydock construction; concrete proportioning; bituminous surface treatment experiments; materials survey; Highway Research Board Conference.

Disintegration. Treated Cement Concrete Resists Scaling, A. A. Anderson. *Explosives Engr.*, vol. 20, no. 1, Jan. 1942, pp. 10–14 and 26–30. Experimental test data in connection with development of chloride-resisting concrete





TVA
Relocates a Railroad
3 NEW BRIDGES
on
UNION METAL MONOTUBES!

WHEN TVA, in the course of one of its projects, found it necessary to relocate a portion of the Southern Railroad near Harriman, Tennessee, three new bridges had to be built.

On this project, as on several before it, TVA used Union Metal Monotubes for the installation of cast-in-place concrete piles. In building the bridge pictured below, sturdy, tapered Monotubes were driven under the stub piers or abutments at both ends, and were also carried directly up into the two bents serving both as columns and supporting pile.

Today, as the construction industry works round the clock to rush completion of the projects so vital to victory, Union Metal Monotubes are featured in more and more piling specifications—for *time-saving* reasons. And over and over again it's demonstrated that Monotubes speed foundation work these four ways...

1. *SPEEDY Handling.* Monotube steel casings are light in weight for fast and economical handling.

2. *SPEEDY Driving.* Tapered Monotubes are so strong and rigid they require no heavy core or mandrel and can be driven with average job equipment (crawler crane, equipped with standard leads and hammer).

3. *SPEEDY Extension.* Use of Extendible Monotubes permits installation of varying pile lengths on the job without delay or waste—permits quick installation even in low headroom.

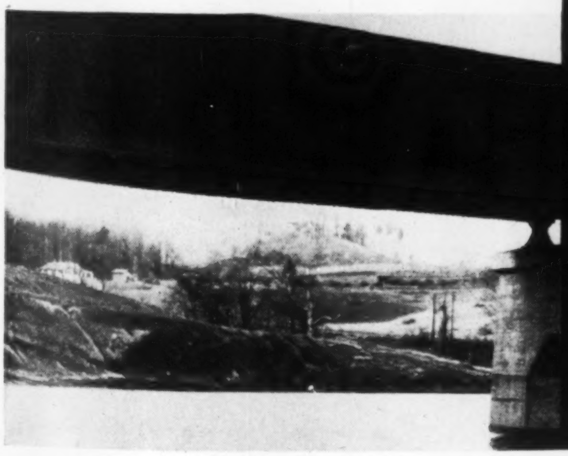
4. *SPEEDY Inspection.* Hollow, tubular design enables you to inspect casing quickly and thoroughly from top to toe, prior to concreting.

Whatever *your* foundation job, Monotubes come in a gauge, taper, and length to satisfy every requirement. And experienced Union Metal foundation engineers are always at your call. Write for Catalog No. 68A!

Design Engineers: TVA Engineering Division

THE
UNION
METAL
MANUFACTURING COMPANY
Canton, Ohio

More Production Means Axis Destruction!



NATURE MAKES BOMBING RAIDS WITH LIGHTNING—

BUT YOU CAN PROTECT VITAL WAR PRODUCTION AGAINST THIS HAZARD

★ Protection of vital war production against accident and sabotage is an important consideration today.

Lightning is Nature's bombing weapon. It can act either as a demolition or an incendiary bomb—can result in disastrous loss and delay.

That is why West Dodd Lightning Protection and static control equipment is being widely used on Army Ordnance Plants. Helping protect ammunition loading lines, standard magazines, underground magazines and bag loading buildings. That is also why many important industrial plants have West Dodd protection on power stacks.

TWO IMPORTANT FACTORS

The 12 old line companies, including the famous Dodd & Struthers Company, pioneer of modern approved lightning protection, are consolidated in West Dodd. This wealth of experience in building and installing lightning protection, and a long proved record of responsibility, are two important factors in your choice of such equipment.

The exclusive, West Dodd, easy-on, solderless bonding clamp. Eliminates hand-wrapping and soldering. Quicker to install. More permanent. Better electrical bond. Made of copper-bronze, tinned when necessary to prevent electrolitic corrosion. Note how boss provides greater number of threads to practically eliminate screw slippage. Sixteen different sizes carried in stock.

TELEPHONE OR TELEGRAPH TODAY!

WEST DODD
LIGHTNING CONDUCTOR CORP.
GOSHEN, INDIANA

by use of treated portland cements and blends with natural cement. Before 17th Annual Convention of Assn. Highway Officials of North Atlantic States, February 1941.

FLOORS. Wire Saves Steel in Concrete Joists. *Eng. News-Rec.*, vol. 128, no. 23, June 4, 1942, pp. 930–932. New floor-system design in which wire has been substituted for steel bars in reinforcing pre-cast concrete joists; higher unit stress in wire than in steel bars and more economical design to avoid need for special floor and ceiling finish bring cost of concrete floors below that of wood construction.

LEVEES, FACING. Levee Banks Paved with Asphaltic Concrete to Stop Erosion. *Construction Methods*, vol. 24, no. 5, May 1942, pp. 54–55 and 112. Levee, near Montrose, Calif., paved for length of 1,600 ft; levee was trimmed to 2:1 slope and protective coating made 5 in. thick, reinforced with wire mesh fastened to 2-in. pipe anchors driven down into fill.

PIPE. Making Porous Concrete Pipe, W. B. Lenhart. *Rock Products*, vol. 45, no. 4, Apr. 1942, pp. 64–66. Notes on plant and practice of Jourdan Concrete Pipe Company at Fresno, Calif.; special pipe is made for use in draining seepage from Friant Dam; company also manufactures fire-resistant pumice concrete-masonry unit.

POLES. Concrete Poles Replace Baltic Firs, J. McCombe. *Elec. Times*, vol. 101, no. 2633, Apr. 9, 1942, pp. 876–879. Table shows classication of concrete poles for 11,000 and 33,000-v overhead lines; handling concrete poles; pole erection.

READY-MIXED. Selling Concrete by Specification, R. S. Torgerson. *Rock Products*, vol. 45, no. 4, Apr. 1942, pp. 63 and 66. Brief illustrated item on practice in plant at Fremont, Ohio; policy is to design mixes that will meet demands for all types of concrete requirements.

READY MIXED. Tower-Mixers Enable Ready-Mix Firm to Offer Complete Concrete Service, H. F. Thomson. *Pit & Quarry*, vol. 34, no. 11, May 1942, pp. 106–107. General Material Co., furnishing service in metropolitan area of St. Louis, Mo., is operating two tower mixers; unit consists essentially of 2-cu yd fixed axis, building mixer, mounted on light truck chassis, which also carries skip for changing dry batches into mixer, and folding tower with bucket for hoisting concrete from mixer to desired level; mixer, skip, and hoist bucket are all drawn by truck engine.

REINFORCEMENT. Studies of Steel Economy in Concrete Slabs and Columns, A. J. Boase. *Eng. News-Rec.*, vol. 128, no. 21, May 21, 1942, pp. 866–867. Comparison of steel required in various types of concrete floor systems shows flat slab to be most economical; columns designed according to 1937 Chicago Code or 1938 New York Code take less steel than if A.C.I. 1941 code is used; if large loads have to be carried on small columns, steel may be saved by using high-strength concrete.

RESERVOIRS. Pre-Stressed Steel Bands Reinforced Circular Concrete Reservoirs with Domed Roofs. *Construction Methods*, vol. 24, no. 5, May 1942, pp. 45, 122, and 124–125. Circumferential reinforcement for circular reservoir wall consists of rings of $1^{3}/_{8}$-in. circular steel rods, pre-stressed by turnbuckles; cross-sectional view of wall shows location of steel bands.

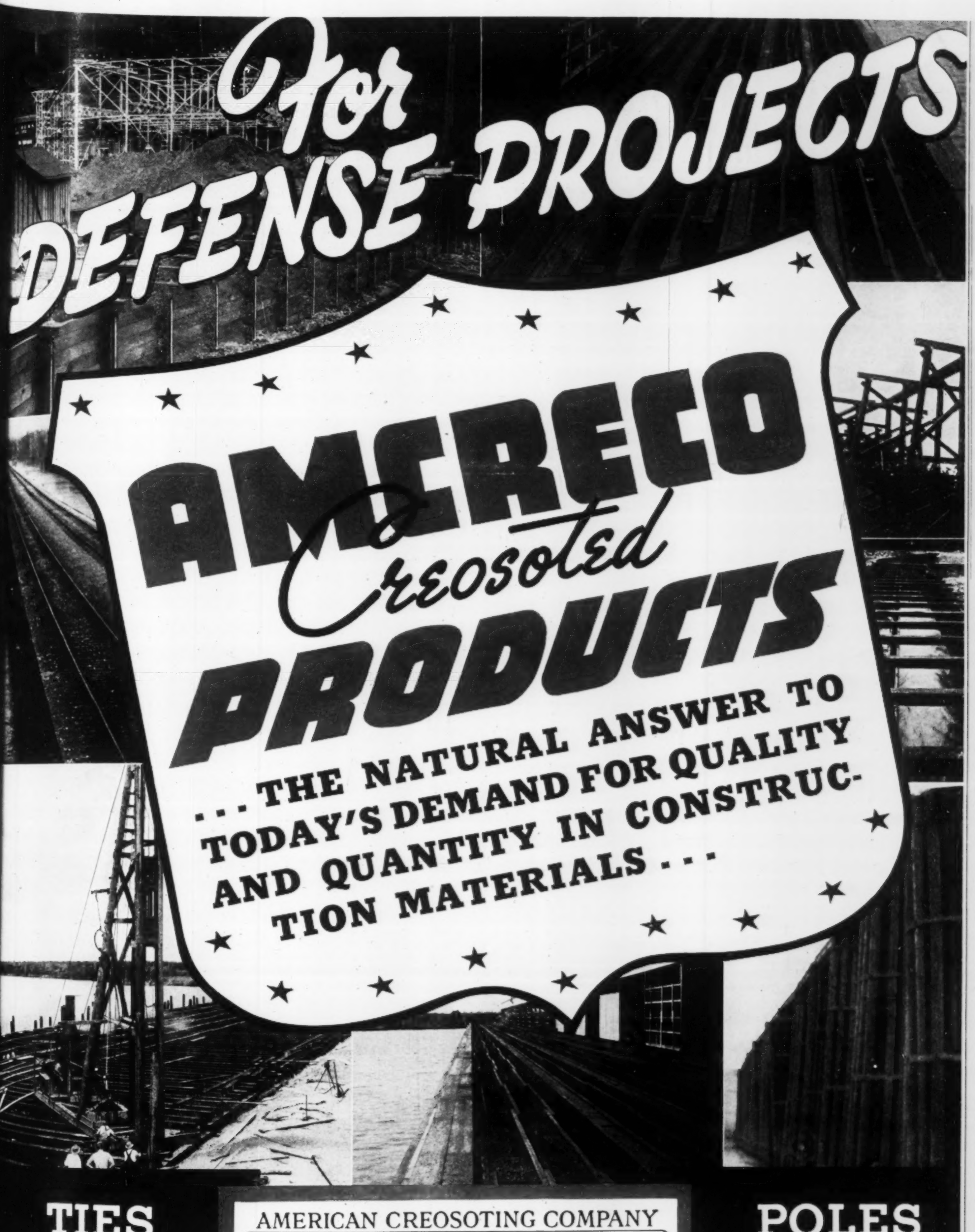
ROADS AND STREETS. Making Minimum Use of Critical Defense Materials, E. C. Lawton. *Am. Highways*, vol. 21, no. 2, Apr. 1942, pp. 9–11, 14–18 and 21. Report on five actual case studies showing practical use of unreinforced concrete design; equations given showing behavior of ends of slabs and extent of cantilever action; bending moments and depth of necessary concrete slabs computed; expansion joints discussed.

TUNNEL LINING. Canal Lining Cured by Sprayed Coats of White-Pigmented Compound, O. G. Borden. *Am. Concrete Inst.—J.*, vol. 13, no. 5, Apr. 1942, pp. 449–451. Expense and inconvenience of water curing by sprinkling 24 hours per day were avoided by using sprayed curing compounds; $8^{1}/_{2}$-mile section was coated with clear compound plus burlap shading for three days; on next section tests showed that white pigmented compound eliminated need of burlap shading; heat reflecting characteristics of compound kept concrete temperatures low.

DAMS

ARCH. Construction of Arch Dam for Temporary Work, J. A. Potford. *Instn. Civ. Engrs.—J.*, no. 4, Feb. 1942, pp. 330–334. Details of construction of three dams covering three inlets to pumping station situated near mouth of river which had been diverted so that it flowed into sea through rock cutting; each dam is 4-ft internal radius and 9 in. thick, constructed without use of heavy plant equipment and using no sheet-piling.

CONCRETE, AUSTRALIA. River Murray Barrages at Mundoo, Boundary Creek, Ewe Island, and Tawitchere Channels, H. G. Oliver and W. M. Anderson. *Instn. Engrs. Australia—J.*, vol. 14, no. 12, Feb. 1942, pp. 25–34. Description of design and construction of dams which, in conjunction with Goolwa Channel Barrage, comprise



For DEFENSE PROJECTS

AMCRECO Creosoted PRODUCTS

. . . THE NATURAL ANSWER TO TODAY'S DEMAND FOR QUALITY AND QUANTITY IN CONSTRUCTION MATERIALS . . .

TIES

PILES

POLES

TIMBER

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY
INCORPORATED

AMCRECO
LOWRY PROCESS CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY
INCORPORATED

ADDRESS INQUIRIES TO CHICAGO, ILL., OR LOUISVILLE, KY.

CELOTEX BUILDING PRODUCTS

Are Immediately Available for Emergency Industrial Building!

WHAT KIND OF BUILT-UP ROOF FOR THAT NEW ADDITION?
GOT TO HAVE QUIET IN OFFICE AND PLANT!
GOT TO PUT UP A LOT OF PARTITIONS FAST!
THERE MUST BE A FLOOR MATERIAL TO TAKE UP SHOCK!
WHAT CAN I GET FOR EXTERIOR WALLS?

Many New Products Now Added to Line
Can Save Weeks of Waiting for "Frozen" Materials!

CONVERSION to war production often requires extensive remodeling. Many conventional materials simply can't be had, regardless of urgency. But Celotex Building Products are readily available—NOW! And, with the addition of many new products specially planned to replace "frozen" materials, they can meet a majority of your emergency building needs!

Whether your immediate need is for insulating exterior walls or factory sound conditioning—whether your current "must" calls for shock-absorbing floors or built-up roofs or substantial partitions—let Celotex Building Products help when you're "on a spot".

Every product marketed under the Celotex name meets rigid Celotex quality standards. All will perform exactly as represented. They are already widely used in government projects from coast to coast. *Write for new booklet giving complete facts!*

CELOTEX
REG. U. S. PAT. OFF.
BUILDING PRODUCTS

The word Celotex is a brand name identifying a group of products marketed by The Celotex Corporation.

THE CELOTEX CORPORATION • CHICAGO

system of dams adopted from river Murray near its mouth in South Australia.

EARTH, MISSISSIPPI. Arkabutla Dam to Be Completed in October. *Eng. News-Rec.*, vol. 128, no. 6, Feb. 5, 1942, pp. 8–9. Main dam and abutment dikes will be of earth-fill type composed mainly of impervious materials such as silty loam and loess; fill material will be obtained from borrow areas and from required excavation for spillway; at crest level, dam will be about 10,000 ft long, not including north ridge dikes, and will have maximum height of 7 ft; total fill is estimated at 4,158,000 cu yd.

NORWAY. Einiges ueber den Norwegischen Talsperrenbau, H. E. Gruner. *Schweizerische Bauzeitung*, vol. 119, nos. 1 and 2, Jan. 3, 1942, pp. 2–4, and Jan. 10, pp. 18–22. Dam construction in Norway; geological ground-water conditions; aspects governing design; illustrated description of some typical and outstanding examples, including Holmevann, Storglomvann, Navann, Bjolsegro, and Langli dams.

FLOOD CONTROL

FORECASTING FLOODS. Nuevo Procedimiento para Analizar Avenidas, A. Garcia Quintero. *Ingenieria* (Mexico), vol. 15, no. 12, Dec. 1941, pp. 370–374. New procedure for analyzing river floods; application of method to bed of San Juan River, as far as Santa Rosalia in state of Tamaulipas; summary of characteristics of method as aid to forecasting probable maximum floods.

NEW YORK. Defense Against Deluge, R. Siegrist. *Explosives Engr.*, vol. 20, no. 2, Feb. 1942, pp. 45–52. Description of Whitney Point Dam and auxiliary works to provide protection to New York State area devastated in 1935 flood disaster; dam is located on Otselic River about three-quarters of a mile above its confluence with Tioughnioga River; with four other units, it will supplement local improvements for protection of Binghamton, N.Y.

RIVERS, IMPROVEMENT. River Channel Tailored to Avert Washouts. *Compressed Air Mag.*, vol. 47, no. 2, Feb. 1942, pp. 6667–6668. Illustrated description of conditions at Little Dalles, in Stevens County, Wash.; for stretch of about 2,500 ft, Columbia River has cut channel through solid limestone formation; at low water, channel is less than 200 ft wide at narrow points and 200 ft deep; under backwater conditions, due to impounding waters above Grand Coulee Dam, Great Northern Railroad was subject to damage; description of improvement work.

FOUNDATIONS

AIRPORT RUNWAYS. Soil Stabilization Methods at March Field. *Excavating Engr.*, vol. 36, No. 4, Apr. 1942, pp. 186–189, 224, 226, and 228. Details of runway laid diagonally down March Field, Calif., in direction of prevailing winds, with 472,000 sq yd of soil cement anchorage embodying unusually effective variation of soil stabilization methods which might well be duplicated where soil conditions are equal.

AIRPORTS, SAVANNAH, GA. Grubbing Airport Site in Georgia, S. Jones. *Excavating Engr.*, vol. 36, no. 3, Mar. 1942, pp. 144–145. Tractor tools play important part in cleaning up 600 areas for Savannah's new municipal airport built to replace $700,000 port drafted for military use; grading problems discussed.

BRIDGE PIERS, CONSTRUCTION. Well Points, Pile Jets, and Crib Cofferdams Serve Builders of Bridge Piers. *Construction Methods*, vol. 24, no. 5, May 1942, pp. 46–48, 92, 94, 96, and 100–101. Construction of forty-two piers and two abutments of 1.1-mile highway bridge at Dubuque, Iowa; well-point system lowered ground-water level on seven piers and eliminated use of cofferdams; two main piers constructed by use of timber crib cofferdams; high pressure air-and-water jets made it possible to sink timber piles for substructure units through sand and gravel substrata.

COLD-WEATHER CONSTRUCTION. Fast Foundations in Frozen Ground. *Eng. News-Rec.*, vol. 128, no. 21, May 21, 1942, p. 853. Winter construction of about 10,000 lin ft of concrete building foundations; features of project were use of burning coke to thaw ground for excavators and use of tents heated by salamanders to protect work until curing was complete; as much as 900 ft of foundation in single line was under tent at one time.

CONSTRUCTION PROJECT. Gridsheet Bank Support Holds Sides of Foundation Cut for New Washington Statler Hotel, C. B. Spencer. *Construction Methods*, vol. 24, no. 5, May 1942, pp. 40–43, 101–102, 104, 106, 108, and 110–111. Gridsheet system of bank support used to protect existing 11-story building 18 ft distant from east side of cut, in building foundation for 14-story hotel.

DRIVING STEEL PILES. Sheetpile Driving Aided by Guide Frame and Slotted Plates on Hammer. *Construction Methods*, vol. 24, no. 4, Apr. 1942, pp. 67 and 133. Driving of 65-ft lengths of steel sheetpiling to form watertight cutoff for closure of cofferdam at Neversink Dam, N.Y.; timber guide frame 32 ft high and 30 ft long aided in accurate alinement of piles; slotted guides in $^3/_4$-in. steel sheets welded to sides of pile hammer enable two units of piling to be driven simultaneously.

PUT
SCRAP TO WORK
AND
Shorten the War!

LET'S FACE THESE FACTS:

It takes about a half-ton of scrap steel to make a ton of new steel—for ships, trucks, tanks, and guns. Scrap steel speeds production. Waste materials—scrap metals, rubber and all the rest—are the life-blood of America's war industry. The demand is great, the supply dwindling.

YOU CAN HELP:

Check your worn-out or obsolete equipment. If it cannot be used, why not scrap it? Collect worn-out tools, old pipe, structurals and other useless material and turn it over to the scrap dealer promptly. Urge your business associates to turn in their scrap as fast as it can be collected. (All scrap steel collected will be purchased by the steel industry at the government-controlled price.) Also encourage your employees and friends to collect all their old rubber and discarded metal household equipment and get it to a local salvage committee, charity or junk dealer.

A JOB FOR EVERYONE:

Collecting scrap materials is a job that no one group can do alone. Every pound turned in will help shorten the war. It's a job that every citizen, every company, and every industry with a stake in America's future must share in doing — today and every day for the duration. The Armco Drainage Products Association, 785 Curtis St., Middletown, O.

ARMCO

TURN IN
YOUR
SCRAP

* * * * *

This advertisement is in support of the Salvage Program of the Bureau of Industrial Conservation, the War Production Board.

FOUNDATIONS

PRETEST UNDERPINNING
TUBA STEEL CYLINDERS
MASS CONCRETE CONSTRUCTION
HEAVY SHORING
DRILLED-IN CAISSONS

DRILLED-IN CAISSONS
FOUNDATIONS
UNDERPINNING

Send for catalogs descriptive of the latest foundation types and methods.

SPENCER, WHITE & PRENTIS, INC.
10 EAST 40th ST. NEW YORK, N. Y.

Speed-Up ALL FIELD SURVEYS!

Preliminary surveys for highway construction, drainage and irrigation systems, dams, water lines, all divisions of civil engineering are speeded up by the *NEW* Paulin Precision Surveying Aneroid. Readings to two feet over a range of 4500 feet are as easy as reading a watch. Other models cover a range of **18,000** feet. Write for complete literature and FREE COPY of the *Paulin Altimetry Manual.*

AMERICAN PAULIN SYSTEM
1847 SOUTH FLOWER STREET
LOS ANGELES, CALIFORNIA

Keep Cylinders at Work

Return empty cylinders promptly to assure an adequate supply of oxygen and acetylene for use in production for victory

THIS CYLINDER CONTAINS OXYGEN
THIS CYLIN ACETY CLOSE VALVE
Return Empties Promptly

ROADS AND STREETS

KANSAS. Maintaining 750 Miles of Road and Building 50 Miles of New for $60,000, J. J. Wardrip. *Pub. Works*, vol. 73, no. 4, Apr. 1942, pp. 14–15 and 30. Elimination of politics and careful selection of personnel and construction equipment made possible building of 50 miles of road and maintaining 750 miles on $60,000 per year, in Elk County, Kansas.

MAINTENANCE AND REPAIR. Street Maintenance Practices—When to Patch and When to Resurface. *Pub. Works*, vol. 73, no. 5, May 1942, pp. 14–15 and 24. Engineers from all sections of country report their practice in deciding whether to patch or resurface given area.

RAILROAD CROSSINGS, GRADE SEPARATION. Lackawanna Raises Tracks Above Streets in Syracuse, N. Y. *Ry. Age*, vol. 112, no. 19, May 9, 1942, pp. 896–900 and 902. Illustrated description of grade-separation project recently completed by Delaware, Lackawanna & Western Railroad; 23 grade crossings were eliminated, two miles of line were elevated, and new passenger station was constructed.

ROAD MATERIALS, BITUMINOUS. Cheap Forms of Road Surfacing Materials, W. J. Hadfield. *Surveyor*, vol. 101, no. 2618, Mar. 27, 1942, pp. 107–109. Report on use and specifications for low-cost road-surface materials with particular reference to tar; some details of experiences with tar surfaces over period long enough to ensure success of such treatment. Before Soc. Chemical Industry and Municipal & County Engrs.

SUBSOILS. Practical Sub Grade Treatment, A. T. Bleck. *Eng. & Contract. Rec.*, vol. 55, no. 8, Feb. 25, 1942, pp. 48–51. Illustrations and explanations of various defects in road surfaces resulting from incorrect subgrades; author stresses fact that complete analysis of soil conditions is essential; discussion of water content of soil; sand lift, base course; frost boils, concrete heaving, and snow cracks discussed.

SEWERAGE AND SEWAGE DISPOSAL

AIR RAID SHELTERS. Sanitation of Tube Railway Stations used for Air-Raid Shelter, L. B. Escritt. *Inst. Civil Engrs.—J.*, vol. 17, no. 2, Dec. 1941, pp. 179–185. Review of problems that confronted London sanitary engineers when subways were converted to air-raid shelters; description and principles of operation of sewage ejectors installed; large separator tanks used to receive discharge of rising main, gravitate sewage to drainage system, and release air to ventilating pipe.

CAMPS, MILITARY. Operating Results on Five Army Biofilter Plants. *Pub. Works*, vol. 73, no. 5, May 1942, pp. 19–20 and 24. Details of operation to date of sewage-treatment plants at Camps Polk, Livingston, Wallace, and Wolters and Fort Bragg; average and peak flows; daily BOD, suspended solids, and pH analyses.

DISPOSAL PLANTS, HAMMOND, IND. Sewage Treatment Works of Hammond, Indiana, C. A. Mason. *Pub. Works*, vol. 73, no. 4, Apr. 1942, pp. 11–13. Sewage from city of 70,000, most of which must be pumped by three plants, is treated in one 30-mgd plant by activated sludge and heated digestion, with 50,000-cu ft gas holder; detailed description of plant.

IOWA. Water and Sewerage Design Problems in Boomtown Areas, C. M. Stanley. *Eng. News-Rec.*, vol. 128, no. 15, Apr. 9, 1942, pp. 548–550. Problems confronting towns of Danville and Middletown in construction of adequate supply facilities to serve population of 1,200; how water supply and sewage systems were built to cope with temporary population but so designed as to serve only 600 people economically in postwar period.

MAINTENANCE AND REPAIR. How to Clean Sewers and Other Underground Pipe Lines. *Ry. Eng. & Maintenance*, vol. 38, no. 4, Apr. 1942, pp. 275–277. Detailed description of chemical and various mechanical methods of doing this kind of work; definite economies and other advantages seen in restoring flow capacity of choked or conjested lines. Report before annual meeting Am. Ry. Eng. Assn.

MILWAUKEE. Sewage Disposal for Housing Project, H. Moore. *Eng. News-Rec.*, vol. 128, no. 13, Mar. 26, 1942, pp. 485–486. Details of construction of sewage system and disposal facilities in suburban Milwaukee to overcome unsatisfactory operation of individual septic tanks; two-story type settling tank design provides some novelty in its arrangements for influent distribution; effluent discharge and sludge control.

NEW YORK CITY. Operating Experiences in New York City, R. H. Gould. *Sewage Works J.*, vol. 14, no. 1, Jan. 1942, pp. 70–80. Outline of plant experiences and equipment involved in sludge digestion, with side line of gas utilization and power production; disposal at sea of solids not wanted for fertilizer; adoption of seasonal treatment in some places and, in general, search for efficient short-time treatment that can largely be operated with power produced.

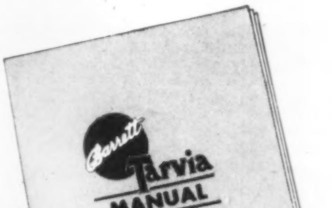
SEWAGE FILTERS, TRICKLING. High Rate Dosing of Gravel Peroclating Beds, J. T. Thompson. *Surveyor*, vol. 101, no. 2615, Mar. 6, 1942, pp. 85–86 and 87. Report of investigation to determine reserve capacity of present bed installa-

AMERICA'S ROADS

MUST BE KEPT IN FIGHTING TRIM, TOO!

Barrett
Tarvia
Tarvia*
Barrett
Tarvia

"Stitch-in-time" road work is especially economical and necessary today. A comprehensive program of maintenance and repair will keep your highways in fighting trim for the duration.



America's all-out Victory Program demands 100 per cent performance from every turret lathe and drill press turning out the munitions of war.

It demands equal performance from every link in our vast transportation system. Strategic cross-continent highways and vital feeder roads must be kept in top condition to assure the mobility of a nation that goes to war on wheels.

It's a huge problem of maintenance—and the responsibility rests with every highway engineer and contractor. Let the Tarvia* field man help you. He can show you how a Tarvia maintenance and repair program can stretch your highway dollar to do *more* of the things required of it. Tarvia is a truly universal paving material—proved by nearly 40 years of service for road-building, maintenance or repair.

Send for the free new Tarvia manual. Its 64 pages, profusely illustrated, show how you can use Tarvia, not only to build new highways, but also—and more important—to extend the life and usefulness of existing roads. Phone, wire or write our nearest office.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK

Chicago . Birmingham . St. Louis . Detroit . Philadelphia . Boston . Providence
Rochester . Lebanon, Pa. . Minneapolis . Cleveland . Columbus . Youngstown . Toledo
Syracuse . Hartford . Norwood, N. Y. . Cincinnati . Buffalo . Bethlehem . Portland, Me.
In Canada: THE BARRETT COMPANY, LTD., Montreal . Toronto . Winnipeg . Vancouver

. . . ONE OF AMERICA'S GREAT BASIC BUSINESSES

*Reg. U. S. Pat. Off.

The Finest

THAT SKILL AND EXPERIENCE CAN BUILD

To our Railroads, America pays thankful tribute! They are doing a magnificent job in speeding troop and war material movement. Since pioneer days, our railroads have led the world in quality, efficiency and capacity. They are the finest that skill and experience can build.

But for these railroads—the shops that build locomotives, cars, rails and equipment, there had to be an abundance of water. With amazingly few exceptions, it was Layne who designed and built their Well Water Systems. Layne Wells and Pumps are famed for their high efficiency, long life and low upkeep cost.

Layne Well Water Systems, like our great American railroads are doing a magnificent job. They are standing up to unmerciful treatment—day after day and month after month of continuous full capacity operation. It is in this tragic period of emergency that Layne reliability, skillful design and rugged construction is most appreciated. Thousands of Layne Well Water Systems are serving railroads, factories, municipalities, irrigation projects and both the Army and Navy. For late catalogs, bulletins, folders, etc., address,

LAYNE & BOWLER, INC.
Memphis, Tenn.

LAYNE
PUMPS & WELL
WATER SYSTEMS

Affiliated Companies

Layne-Arkansas Company............Stuttgart, Ark.
Layne-Atlantic Company..................Norfolk, Va.
Layne-Bowler New England Corp...Boston, Mass.
Layne-Central Company.............Memphis, Tenn.
Layne-Northern Company..........Mishawaka, Ind.
Layne-Louisiana Company......Lake Charles, La.
Louisiana Well Company...............Monroe, La.
Layne-New York Company..........New York City
Layne-Northwest Company......Milwaukee, Wis.
Layne-Ohio Company..................Columbus, Ohio
Layne-Texas Company..............Houston, Texas.
Layne-Western Company..........Kansas City, Mo.
Layne-Western Co. of Minn.....Minneapolis, Minn.
International Water Supply, Ltd...London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

tion at Leeds sewage works; also to find out effect of high-rate dosing on beds.

SEWERS, DESIGN. Sewerage Design for Housing Projects. *Eng. News-Rec.*, vol. 128, no. 19, May 7, 1942, pp. 775–776. Design standards for storm and sanitary sewer facilities on public housing projects are outlined; these standards form part of official site engineering recommendations prepared by federal Public Housing Authority to expedite construction of projects.

SEWERS, MAINTENANCE AND REPAIR. Sewer Squad Organization for Air Raids. *Eng. News-Rec.*, vol. 128, no. 11, Mar. 12, 1942, pp. 423–424. Sewer repair and maintenance forces in Chicago have been organized to perform special emergency functions during aerial bombardment; regular staff of more than 400, augmented with 400 citizens, is believed able to handle 22 simultaneously bombed sewers.

SLUDGE. Good Practice in Sludge Disposal, W. Rudolfs. *Eng. News-Rec.*, vol. 128, no. 9, Feb. 26, 1942, pp. 330–333. Analysis and discussion of most important points stressed in symposium on dewatering, drying, and incineration of sludge, presented at recent meeting of Am. Soc. C.E.

STRUCTURAL ENGINEERING

CONCRETE DESIGN. Design of Bow Girders in Reinforced Concrete—II, W. T. Marshall. *Concrete & Constr. Eng.*, vol. 37, no. 4, Apr. 1942, pp. 126–131. Further details of distribution of twisting moment given.

CULVERTS, WOODEN. Armco Designs Wood Culvert to Conserve Critical Material. *Eng. News-Rec.*, vol. 128, no. 15, Apr. 9, 1942, p. 540. Armco Drainage Products Assn. has developed octagonal shaped wood pipe, made from various sizes of lumber according to load requirements and fastened together with wood dowels, eliminating all metal; units are shop-assembled into lengths of 12 ft or more, which are joined together in field into single structure.

HANGARS, DOORS. Collapsible Doors for Airplane Hangars. *Eng. News-Rec.*, vol. 128, no. 19, May 7, 1942, pp. 772–774. Steel-frame doors that disappear below floor level when in open position are being used on two airplane hangars at Garner Field in Texas to provide $20\frac{1}{2} \times 100$-ft end openings; doors fold into $5\frac{1}{2}$-ft deep trench; their construction calls for exterior covering of longitudinal leaves of sheet metal 30 in. wide and these leaves are stacked side by side when door is lowered into trench.

MASONRY STRUCTURES. Rubble Masonry to Save Critical Material, L. M. Winsor. *Eng. News-Rec.*, vol. 128, no. 13, Mar. 26, 1942, pp. 182–184. Methods of laying rubble masonry are outlined; no steel, minimum of concrete, and no mechanized equipment required; each stone is laid as header, with its thick end out and its inner end sloping downward; large stones only used; voids are filled with coarse-aggregate concrete.

ROOFS, BOMBING EFFECT. Bomb Damage to Welded Station Roof. *Ry. Gaz.*, vol. 76, no. 15, Apr. 10, 1942, pp. 460–461. Brief note on damage during aerial bombardment of recently constructed welded steel platform roof; illustrations given.

ROOFS, SUPPORTS. Wire Cables Support Roof of Unique Storage Structure. *Eng. & Contract. Rec.*, vol. 55, no. 10, Mar. 11, 1942, pp. 8–9 and 17. Demand for low-cost temporary building to store surplus grain was met at Fort William, Ontario, by using wire rope to support sheet-metal roof laid on timber purlins.

STRUCTURAL DESIGN. Tubular Members to Save Steel, H. S. Card. *Eng. News-Rec.*, vol. 128, no. 11, Mar. 12, 1942, pp. 418–419. Tubes have most efficient sections for compression and torsional loads, are as efficient for tension loads as rolled sections, and can often be used to resist bending economically; welding makes tube fabrication and jointing practicable; by thoughtful designing, structures can be built of tubular members at substantial saving in steel over use of conventional rolled sections.

TRUSSES. Big Trusses for Tallest Dallas Building. *Eng. News-Rec.*, vol. 128, no. 19, May 7, 1942, pp. 782–784. Building 433 ft high, utilizes 50-ton trusses of 61-ft span and $14\frac{1}{2}$-ft depth; trusses carry 28 floors of building and are joined to supporting columns by unusually heavy gusset plates; wind bracing system makes each bent carry its share of load.

WOODEN CONSTRUCTION. Scientific Use of Wood in Structures. *Pub. Works*, vol. 73, no. 5, May 1942, pp. 25–26. With present scarcity of steel for non-war use, wood must be used much more generally; how connectors aid in this.

TRAFFIC CONTROL

HIGHWAY TRAFFIC SIGNS, SIGNALS AND MARKINGS. Painting Safety Into Roads, J. M. MacKinnon. *Roads & Bridges*, vol. 80, no. 4, Apr. 1942, pp. 28–29, 48, and 52. Illustrated description of machinery and procedure in laying reflectorized zone lines on Kings Highway near Toronto; painted lines have been made completely effective after dark by embedment in paint of tiny glass spheres that act like miniature reflector buttons.

TUNNELS

RAILROAD, ALASKA. Tunneling Chugach Range for Alaska Railroad. *Pac. Builder & Engr.*, vol. 48, no. 2, Feb. 1942, pp. 30–33. West Construction Company is driving two major railroad tunnels between Passage Canal and Portage Junction; snowsheds protect workers at portals from slides and avalanches; tunnels are each 16 ft wide and 22 ft high from grade to top of arch which is formed on 8-ft radius.

MILITARY ENGINEERING. Water Supplies for Army, W. A. Hardenbergh. *Am. Water Works Assn.—J.*, vol. 34, no. 1, Jan. 1942, pp. 11–16. Report on problems and methods of making provision for adequate water supplies for army both in cantonments and in field; discussion includes information on distribution system design, field water supplies, mobile purification equipment, warfare gases in water supplies, and protection of civilian supplies.

SOUTH DAKOTA. Hydrologic Study of White River Valley, E. P. Rothrock. *S. Dakota State Geol. Survey—Report Investigations*, no. 41, Feb. 1942, 32 pp., supp. plates. Investigation to determine feasibility of pump irrigation in White River valley; irrigation of small plots in this valley had met with considerable success, indicating that conditions were right for agriculture except for shortage of water; conclusion is that careful location of wells and intelligent use of available water should make it possible to materially increase crop farming.

WATER TREATMENT

FILTRATION PLANTS, GRIFFIN, GA Filter Maintenance at Griffin, Ga., Water Works, L. R. Simonton. *Pub. Works*, vol. 73, no. 5, May 1942, pp. 28 and 41. Usual rapid sand filter is designed to operate at rate of 125 million gal per acre per day; under operating practice at Griffin it has been found that, when loss of head exceeds $6\frac{1}{2}$ ft, filter will begin to pass coagulated matter and bacteria count will increase from usual count of 3–10 to 35–50; practice of washing filters when loss of head reaches 6 ft has been adopted; by this practice, and with proper maintenance, excellent effluents can be produced at all times.

POLLUTION, FLORIDA. Salt Water Intrusion at Miami, A. B. DeWolf. *Pub. Works*, vol. 73, Mar. 1942, pp. 22–23. Due to salt water backing 7 miles up Miami River to site of city's wells when unusually dry spells greatly diminish flow of river, wells at Miami became salty; remedies tried and proposed.

SOFTENING, ZEOLITE PROCESS. Economical Method of Base Exchange Water Softening. *Eng. & Contract. Rec.*, vol. 55, no. 4, Jan. 28, 1942, p. 13. Description of process by which it is claimed water flow of 5 gal per sq ft per min can be maintained with bed 3 ft in depth; chief expense of base exchange plant is salt used for regeneration.

STANDARDS. Revision of Drinking Water Standards, J. K. Hoskins. *Eng. & Contract. Rec.*, vol. 55, no. 7, Feb. 18, 1942, pp. 6–7. Considerations underlying proposed changes in drinking water standards; features of bacteriological requirements; uniformity desired in laboratories and laboratory methods; changes in physical and chemical characteristics. Before Am. Water Works Assn.

SWIMMING POOLS. Time Factor in Chlorine and Chloramine Disinfection of Contaminated Swimming Pool Water, E. T. Chanlett and H. B. Gotaas. *Am. J. Pub. Health*, vol. 32, no. 4, Apr. 1942, pp. 355–364. Results of series of observations at two public outdoor pools and in experimental tank under varying chlorine and chloramine dosages are indicated. Bibliography. Before Am. Pub. Health Assn.

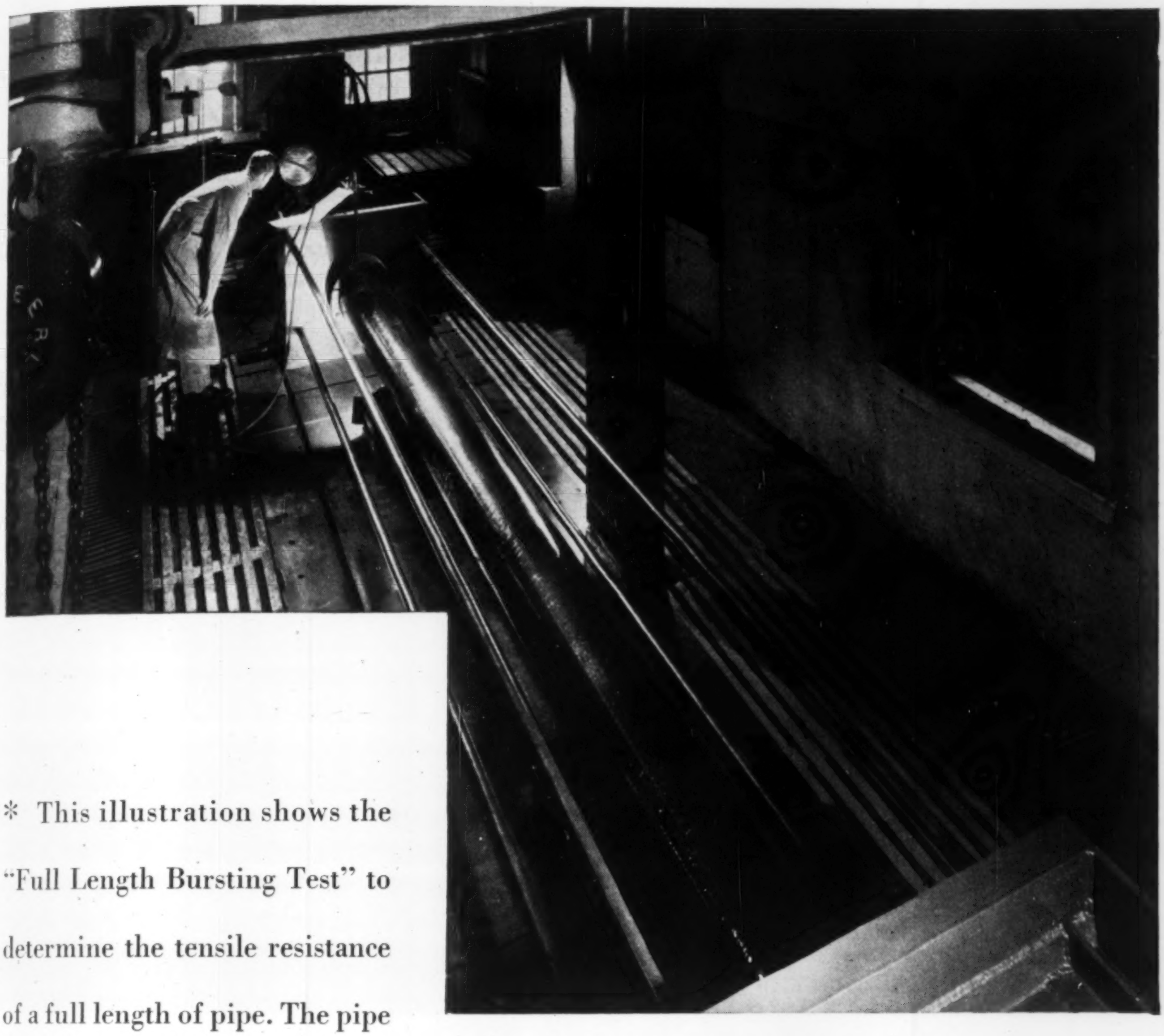
WATER WORKS ENGINEERING

MAINTENANCE AND REPAIR IN BRITAIN. Wartime Water Works Maintenance in Britain, A. C. Wildsmith. *Am. Water Works Assn.—J.*, vol. 34, no. 2, Feb. 1942, pp. 179–188. Record of experiences and discussion of attendant problems and their solution; plans to maintain adequate water supply include steps taken to obtain rapid and accurate information of damage to mains and works; to shut off broken mains; to minimize loss of pressure and provide drinking water; and to repair damage.

OKLAHOMA CITY. Dual Water Supply for Oklahoma City. *Eng. News-Rec.*, vol. 128, no. 19, May 7, 1942, pp. 788–790. New 40-mgd water supply to be obtained from North Canadian River; details of new supply project which will include long earth dam, $5\frac{1}{2}$ miles of canal, 3,500-ft siphon, and new treatment and pumping plant.

PREPARING FOR EMERGENCIES. New York State Mutual Aid Plan for Water Service In Case of Emergencies, A. F. Dappert. *Am. Water Works Assn.—J.*, vol. 34, no. 2, Feb. 1942, pp. 189–199. Outline of plan with forms showing inventory of personnel and equipment; general objective is to prepare New York State municipalities to maintain adequate, effective, and safe water service under any possible emergency that may arise, either as result of war or from natural causes, and to achieve this state of preparation with least possible delay.

WELLS, DISINFECTION. Disinfection Methods for Deep Wells, E. C. Jensen. *Pub. Works*, vol. 73, no. 4, Apr. 1942, pp. 21 and 42. Detailed description of three methods of applying chlorine and of one for sealing tops of wells.



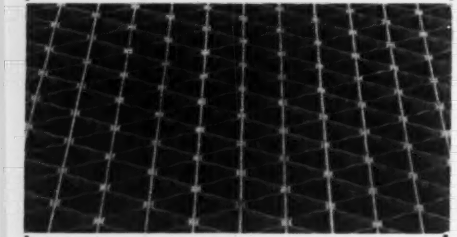
* This illustration shows the "Full Length Bursting Test" to determine the tensile resistance of a full length of pipe. The pipe is subjected to progressively increased hydrostatic pressure until failure occurs. Although not a required acceptance test, it is one of the additional tests regularly made by this Company to further check and maintain the quality of its pipe so that it will adequately meet severe service requirements. *United States Pipe and Foundry Co., General Offices: Burlington, New Jersey*. Sales Offices in Principal Cities.

*** One of a series of controls in operation at each of our plants, beginning with inspection and analysis of raw materials and ending with tests of the finished product, all subject to the central control of our headquarters staff at Burlington.**

U.S.
cast iron
PIPE
Centrifugally or Pit Cast for water, gas, sewerage, drainage and industrial services.

IRVING DECKING

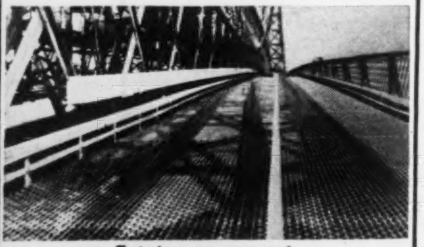
The Open Steel Bridge Pavement
Lightweight • Safe • Economical



Is that Old Bridge overloaded?

You can reduce its dead load considerably by removing its solid floor and installing Irving Decking, weighing only 15¼ pounds per square foot.

Our Engineering Department will be glad to co-operate in solving your bridge floor problems.



Catalog on request

IRVING SUBWAY GRATING CO., INC.
5008 27th Street
LONG ISLAND CITY, NEW YORK

AMERICAN SOCIETY OF CIVIL ENGINEERS FOUNDED 1852

Why do so many ENGINEERS ask for all 24 of the ASCE MANUALS?

These Manuals of Engineering Practice, compiled by men of wide experience and acknowledged authority, contain information useful to the civil engineer in his every-day work. They present facts, briefly and to the point, and should be of value to you. You can get the list of Manuals published to date by mailing the coupon.

American Society of Civil Engineers
33 West 39th Street, New York, N.Y.

Please send, without obligation, complete list of 24 Am. Soc. C.E. Manuals.

Name ....
Address ....
City .... State ....

Equipment, Materials, and Methods

New Developments of Interest, as Reported by Manufacturers

New Flame Cutting Tips

TWO ADDITIONS TO THEIR LINE of oxy-acetylene flame cutting tips have just been announced by Air Reduction. The first, known as Style 108, is ideal for working in close quarters. It is bent in an offset shape, to permit cutting along a line $^{21}/_{32}$ in. from the vertical center-line of the torch head or barrel. This offset design meets the problem of cutting close to bulkheads, flanges or shoulders where the radius of the torch head would prevent alignment of the cutting orifice vertically over the desired line of cut. The Style 108 tip has milled flat sides, with two preheat flanges, and is suitable for either machine cutting or hand cutting operations. It is available at present in sizes Nos. 1 to 3, for cutting steel up to $1^1/_2$ in. thick.

The other new addition to the line is the Style 139 straight tip with one preheat orifice, for certain machine or hand cutting operations. This is a companion tip to the recently announced Style 119, which carries two preheat orifices. Made in sizes Nos. 0 to 3, Style 139 is particularly adapted to splitting angle iron, straight-line cutting using a straight edge as a guide, or sheet metal cutting operations, in which light preheat is desired. Write to Air Reduction, New York, N.Y.

Glass Insulating Board

A UNIQUE GLASS BOARD, made of thousands of tiny airtight cells and weighing only one-fifteenth as much as ordinary glass, has been introduced by the Armstrong Cork Co. as a low-temperature insulating material. This new non-priority product will be known as Armstrong's Foamglas. It is manufactured by firing ordinary glass which has been mixed with a small quantity of pure carbon. At the proper temperature, the glass softens and the carbon turns into a gas which then acts upon the molten glass in such a manner that a "cellulated" product is obtained. Hard, vitreous slabs of Foamglas are produced, in which the cells are uniformly small in size and entirely sealed one from another. Foamglas is made by the Pittsburgh-Corning Corp. and is marketed exclusively in the low-temperature insulation field by the Armstrong Cork Co. It is supplied in one board size of 12 in. by 18 in., thicknesses of 2, 3, $4^1/_2$, and 6 in.

Foamglas is fireproof and waterproof. It will not rot, mold, or decay. Since it is manufactured of an inorganic material, it is also vermin-proof and odorless. It can be sawed much easier than ordinary wood. Foamglas has a wide range of possibilities for use where both insulating value and structural strength are important. As an example of the latter, walls of Foamglas will readily support the insulated ceiling. Write to the Building Materials Div., Armstrong Cork Co., Lancaster, Penna.

Load-Center Substations

NEW STANDARDIZED LOAD CENTER unit substations are now available in sizes ranging from 100 to 2000 kva, according to an announcement by the Allis-Chalmers Mfg. Co., Milwaukee, Wis.

The standard unit substations offer a wide choice of incoming- and outgoing-line arrangements. The substation consists of a metal-enclosed incoming-line section, a throat-connected transformer and a low voltage feeder section.

On the high voltage side potheads, disconnect switches, oil fuse cut-outs, metal-clad switchgear or direct connection through terminal box can be supplied. On the low voltage side, stationary or drawout air breakers, electrically or manually operated, are furnished. Transformers can be oil immersed, dry type, or non-inflammable liquid-filled.

New Carryall Model

TO STANDARDIZE AND SIMPLIFY its scraper line, R. G. LeTourneau, Inc., Peoria, Ill., announces the Model D Carryall to replace former models X and Z. The improved and newly designed small scraper has a struck capacity of 3.5 cu yds, and incorporates the same features of design and operation that are standard on larger Carryall models. Major changes include stronger and heavier box-type construction; overhead spring pipe; large carrying apron; elimination of throw-arm for raising and lowering blade and bowl. The Model D Carryall Scraper is designed to work with either the D4 or D6 "Caterpillar" tractor.

Drawing Instruments

AVAILABLE IN THREE combinations of bows, drop bows, and pens, a complete line of American-made drawing instruments has been announced by the V & E Engineering Co. of Pasadena, Calif.

Sold under the trade name "Vemco," these instruments are said to embody new and unique features of open truss design which increases strength and rigidity while cutting weight by 40%. Each bow has a center-screw adjustment which articulates with the legs by cylindrical nuts. The legs bear upon a double-grooved hinge pin of broad base, assuring strength and perfect alignment. Construction is of steel, satin-chrome plated.

COLOR FOR RUBIES . . . BACKBONE FOR STEEL!

Chromium, the element that imparts precious color to rubies, imparts something more precious to steel. It gives steel incredible hardness and resistance to heat and corrosion. It makes steel strong, yet ductile and shock-resistant.

Chromium is the key that has opened — and is still opening — great new fields of application for steel. Without chromium, the whole wonderful series of *stainless steels* would not have been possible. From tarnish-free tableware to corrosion-resistant chemical equipment . . . from strong, lightweight truck bodies to streamlined trains and airplanes . . . from heat-defiant boiler tubes to high-temperature steam turbines . . . chromium has made possible a *steel* with properties of the *noble metals.*

But the stainless steels are only one great contribution of chromium. This element has also helped to provide hard, shock-resistant armor plate and armor-piercing projectiles; long-wearing engine valves; strong, tough gears, tools, ball bearings, car trucks, shafts, springs, and dies; and hundreds of other improved articles.

We do not make steel of any kind. But for over 35 years, we have made ferro-alloys and alloying metals used in steelmaking. Among these are chromium, silicon, manganese, vanadium, tungsten, zirconium, columbium, and calcium.

It was our research and development that made the low-carbon grades of ferro-chromium available commercially. Without these, production of a majority of the stainless steels would have been impracticable. Inquiries about stainless and other alloy steels — their manufacture, fabrication, and use — are cordially invited.

The progress made by Electro Metallurgical Company in the manufacture and use of ferro-alloys and in the development of alloy steels has been greatly facilitated by metallurgical research in the laboratories of Electro Metallurgical Company and Union Carbide Company; by the advances in electric furnace electrodes and techniques of National Carbon Company, Inc.; and by the broad experience in the production, fabrication, and treatment of metals of Haynes Stellite Company and The Linde Air Products Company. All of these companies are Units of Union Carbide and Carbon Corporation.

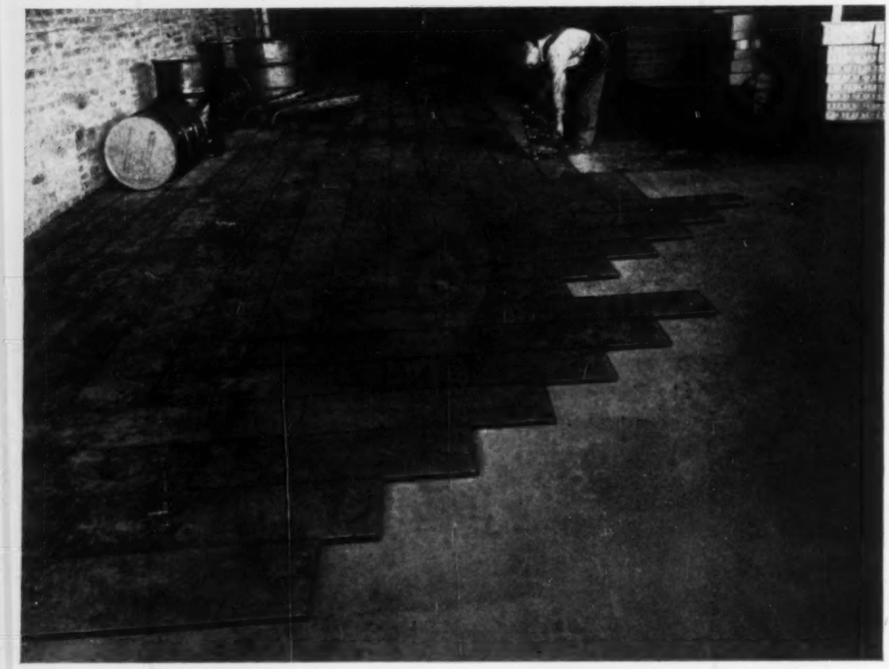
ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

30 EAST 42ND STREET NEW YORK, N.Y.

FOR VICTORY
BUY
UNITED STATES
WAR
BONDS
AND
STAMPS



Quicker—Safer—Economical

SERVICISED INDUSTRIAL FLOORING

Speed up loading and trucking production by surfacing old worn floors with Servicised Asphalt Industrial Flooring. The rugged durability, smoothness and resiliency of Servicised Flooring has proven its worth under the pounding wear of loading docks and various plants. In addition, this flooring is practically noiseless under truck wheels, is fire-retarding, acid-resisting, lessens accidents, waterproof and has a non-skid surface.

Combine these various advantages and you have the lowest long service floor maintenance cost possible.

Servicised Industrial Flooring arrives on the job in convenient sized planks of required widths, lengths and thickness. This flooring can be installed without interruption of plant operation.

●

Engineers and others interested in heavy duty plant flooring should write for our descriptive literature with complete details.

SERVICISED QUALITY PRODUCTS © 1930

SERVICISED PRODUCTS CORP.

6051 West 65th Street, Chicago, Ill.

INDEX OF PRODUCTS

- ACETYLENE
  - Air Reduction Sales Co.
- ACETYLENE GENERATORS
  - Air Reduction Sales Co.
- AERIAL CABLEWAYS AND TRAMWAYS
  - American Steel & Wire Co.
- AIRPORT DRAINAGE
  - Armco Drainage Products Assn.
  - Lock Joint Pipe Co.
- AIR RAID SHELTERS
  - Armco Drainage Products Assn.
- ALLOYS, FERRO
  - Electro Metallurgical Co., Unit of Union Carbide and Carbon Corp.
- ALTIMETERS
  - American Paulin System
- ALUMINUM, STRUCTURAL
  - Aluminum Co. of America
- ARC WELDING EQUIPMENT
  - Lincoln Electric Co.
- ASPHALT PLANK BRIDGE AND INDUSTRIAL FLOORING
  - Philip Carey Mfg. Co.
- BARS, ALUMINUM
  - Aluminum Co. of America
- BARS, IRON AND STEEL
  - Carnegie-Illinois Steel Corp.
- BLOWER PIPE, STEEL, FOR VENTILATION PURPOSES
  - Lock Joint Pipe Co.
- BORINGS, TEST
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- BRIDGE CABLES
  - American Steel & Wire Co.
- BRIDGE FLOORS, GRATING
  - Irving Subway Grating Co., Inc.
- BRIDGE PLANKS, MINERAL SURFACED ASPHALT
  - Philip Carey Mfg. Co.
- CABLES, ELECTRIC
  - Lincoln Electric Co.
- CAISSONS
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- CEMENT PORTLAND
  - Portland Cement Assn.
- COATINGS, ANTI-CORROSIVE
  - Bakelite Corp.
- CONCRETE REINFORCEMENT
  - American Steel & Wire Co.
  - Carnegie-Illinois Steel Corp.
- CONDUCTORS, LIGHTNING
  - West Dodd Lightning Conductor Corp.
- CONTRACTORS
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- CORRUGATED SHEETS, ALUMINUM
  - Aluminum Co. of America
- CREOSOTED PILES, POLES, TIES AND TIMBER
  - American Creosoting Co.
- CRIBBING, METAL
  - Armco Drainage Products Assn.
- CULVERTS, CAST IRON
  - Cast Iron Pipe Research Assn.
  - U. S. Pipe & Foundry Co.
- CULVERTS, CORRUGATED IRON AND SHEETS
  - Armco Drainage Products Assn.
- CULVERTS, REINFORCED CONCRETE
  - Lock Joint Pipe Co.
- DAMP-PROOF COMPOUNDS
  - Barrett Division, Allied Chemical and Dye Corp.
  - Philip Carey Mfg. Co.
- DRAFTING INSTRUMENTS AND MATERIALS
  - Keuffel & Esser Co.
- DRAINS, PERFORATED IRON
  - Armco Drainage Products Assn.
- DRAINS, REINFORCED CONCRETE
  - Lock Joint Pipe Co.
- DRAWING SUPPLIES
  - Keuffel & Esser Co.
- ENGINEERS
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- ENGINEERING INSTRUMENTS
  - American Paulin System
  - Keuffel & Esser Co.
- FERRO-ALLOYS
  - Electro Metallurgical Co., Unit of Union Carbide and Carbon Corp.
- FILLER, ASPHALT
  - Philip Carey Mfg. Co.
- FLOORING, ALUMINUM
  - Aluminum Co. of America
- FLOORING, GRATING
  - Irving Subway Grating Co., Inc.
- FLOORING, SHOCK-ABSORBING
  - Celotex Corp.
- FLOORING, STEEL
  - Carnegie-Illinois Steel Corp.
- FLUX, WELDING, BRAZING, ETC.
  - Air Reduction Sales Co.
- FOUNDATIONS
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
  - Union Metal Manufacturing Co.
- GALVANIZING AND GALVANIZED PRODUCTS
  - Enterprise Galvanizing Co.
- GAUGES, ACETYLENE, OXYGEN
  - Air Reduction Sales Co.
- GENERATORS, ELECTRIC
  - Lincoln Electric Co.
- GRATING, STEEL FLOORING
  - Irving Subway Grating Co., Inc.
- INKS, WATERPROOF, PIGMENT, DRAWING
  - Keuffel & Esser Co.
- INSTRUMENTS
  - American Paulin System
  - Buff & Buff Co.
  - Keuffel & Esser Co.
- INSULATING MATERIALS
  - Celotex Corp.
- JOINTS, EXPANSION, PAVING
  - Barrett Division, Allied Chemical & Dye Corp.
  - Philip Carey Mfg. Co.
- LETTERING GUIDES
  - Keuffel & Esser Co.
- LEVELS
  - Buff & Buff Co.
  - Keuffel & Esser Co.
- LIGHTNING PROTECTION
  - West Dodd Lightning Conductor Corp.
- MACHINERY, PIPE CUTTING AND BEVELLING
  - Air Reduction Sales Co.
- MEASURING TAPES
  - Keuffel & Esser Co.
- METAL CONNECTORS FOR TIMBER JOINTS
  - Timber Engineering Co.
- METAL TERMITE SHIELDS
  - Timber Engineering Co.
- METERS, ELECTRIC
  - Lincoln Electric Co.
- MOTORS, ELECTRIC
  - Lincoln Electric Co.

Continued on page 31

INDEX OF PRODUCTS

Continued from page 30

Nickel and Its Alloys
International Nickel Co., Inc.

Oxygen
Air Reduction Sales Co.

Paints
Barrett Division, Allied Chemical & Dye Corp.

Paint Pigment, Aluminum
Aluminum Co. of America

Paper, Drawing and Tracing
Keuffel & Esser Co.

Partition Materials
Celotex Corp.

Paving Materials
Barrett Division, Allied Chemical & Dye Corp.
Portland Cement Assn.

Penstocks
Lock Joint Pipe Co.

Piles, Concrete
MacArthur Concrete Pile Corp.
Raymond Concrete Pile Co.
Union Metal Manufacturing Co.

Piles, Creosoted
American Creosoting Co.

Piles, Steel Bearing
Carnegie-Illinois Steel Corp.

Piles, Steel Shell
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.
Union Metal Manufacturing Co.

Piling, Steel Sheet
Carnegie-Illinois Steel Corp.
Union Metal Manufacturing Co.

Pipe, Cast Iron
Cast Iron Pipe Research Assn.
U. S. Pipe & Foundry Co.

Pipe, Reinforced Concrete
Lock Joint Pipe Co.

Pipe Fittings, Cast Iron
Cast Iron Pipe Research Assn.
U. S. Pipe & Foundry Co.

Plastic, Asphalt
Philip Carey Mfg. Co.

Plastics
Bakelite Corp.

Poles, Creosoted
American Creosoting Co.

Portland Cement
Portland Cement Assn.

Pumps
Layne & Bowler, Inc.

Regulators, Oxyacetylene
Air Reduction Sales Co.

Reinforcement Fabric
American Steel & Wire Co.

Resins, for Protective Coatings
Bakelite Corp.

Road Oils
Barrett Division, Allied Chemical & Dye Corp.

Road Surfacing Materials
Barrett Division, Allied Chemical & Dye Corp.

Roofing Materials
Barrett Division, Allied Chemical & Dye Corp.
Philip Carey Mfg. Co.
Johns-Manville Corp.

Rope, Wire
American Steel & Wire Co.

Sewer Pipe, Reinforced Concrete
Lock Joint Pipe Co.

Sheets, Aluminum
Aluminum Co. of America

Sheets, Iron and Steel
Carnegie-Illinois Steel Corp.

Shoring
Spencer, White & Prentis, Inc.

Static Control Equipment
West Dodd Lightning Conductor Corp.

Steel, Structural
Carnegie-Illinois Steel Corp.

Steps, Safety Grating
Irving Subway Grating Co., Inc.

Storm Sewers, Corrugated Iron
Armco Drainage Products Assn.

Strands, Wire
American Steel & Wire Co.

Subaqueous Intakes and Outfalls, Reinforced Concrete
Lock Joint Pipe Co.

Surveying Instruments
American Paulin System
Buff and Buff Co.
Keuffel & Esser Co.

Tar
Barrett Division, Allied Chemical & Dye Corp.

Termite Shields
Timber Engineering Co.

Ties, Creosoted
American Creosoting Co.

Timber, Creosoted
American Creosoting Co.

Timber Joint Connectors
Timber Engineering Co.

Torches, Welding and Cutting
Air Reduction Sales Co.

Track, Industrial and Portable
Carnegie-Illinois Steel Corp.

Transits
Buff & Buff Co.
Keuffel & Esser Co.

Underpinning
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

Waterproofing Materials
Barrett Division, Allied Chemical & Dye Corp.

Waterproofings, Membrane
Philip Carey Mfg. Co.

Water Supply Equipment
Layne & Bowler, Inc.

Water Supply Pipe, Reinforced Concrete
Lock Joint Pipe Co.

Welding and Cutting Apparatus
Air Reduction Sales Co.

Welding Machines, Electric Arc
Lincoln Electric Co.

Welding Rods and Wire
American Steel & Wire Co.
Lincoln Electric Co.

Well Water Systems
Layne & Bowler, Inc.

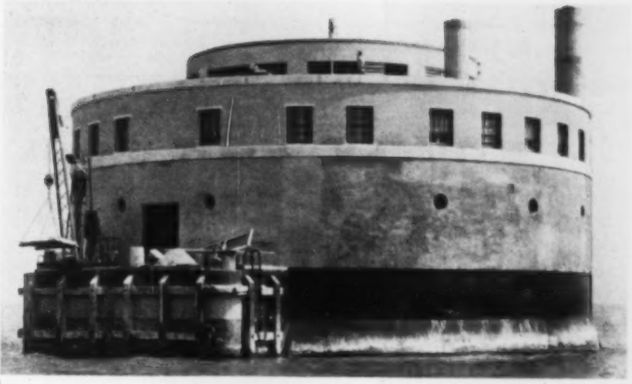
Wire and Cables, Electrical
American Steel & Wire Co.

Wire Rope and Strands
American Steel & Wire Co.

Wood Preservatives
Barrett Division, Allied Chemical & Dye Corp.

Alphabetical Index to Advertisers shown on page 32

The Society reserves the privilege of rejecting advertisements inconsistent with its ethical procedure



Contractor: Watts Construction Co., Toledo

TOLEDO'S NEW WATER SUPPLY SYSTEM PROTECTED BY Carey BONDED BUILT-UP ROOFS

The Toledo Lake Erie Water Supply System, completed in the fall of 1941, is believed to be the most modern plant of its character in existence.

The crib and conduit are built to meet the estimated needs of the city for the year 2,000; the remainder of the system for the year 1970. When you find construction predetermined for such permanence, it is logical that you should find it protected by CAREY Bonded Built-Up Roofs, known the country over for their in-built defiance of time and weather.

Whatever your roofing needs, make sure of dependability and rock-bottom economy—specify CAREY Built-Up Roofs. For details, address Dept. 81.

THE PHILIP CAREY MFG. COMPANY
Dependable Products Since 1873. Lockland, CINCINNATI, OHIO
IN CANADA: The Philip Carey Co., Ltd. Office & Factory: Lennoxville, P. Q.

BUFF
TRADE MARK TRADE MARK

WORLD FAMOUS FOR 74 YEARS

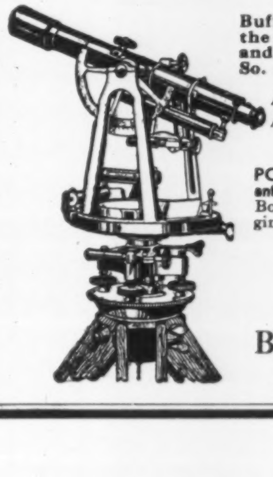
Transits and Levels for Civil and Mining Engineers

Buff precision and design are continuously in the forefront.

ENGINEERS and contractors know that BUFF performance is accurate and sure—with adjustments that hold permanently.

THE BUFF "X" TELESCOPE

has the finest and highest definition and simplest lens system. It is useful when the light is dim.



Buff is used almost exclusively on the largest works in this country and Canada and Mexico and So. America.

Astronomical lens experts.

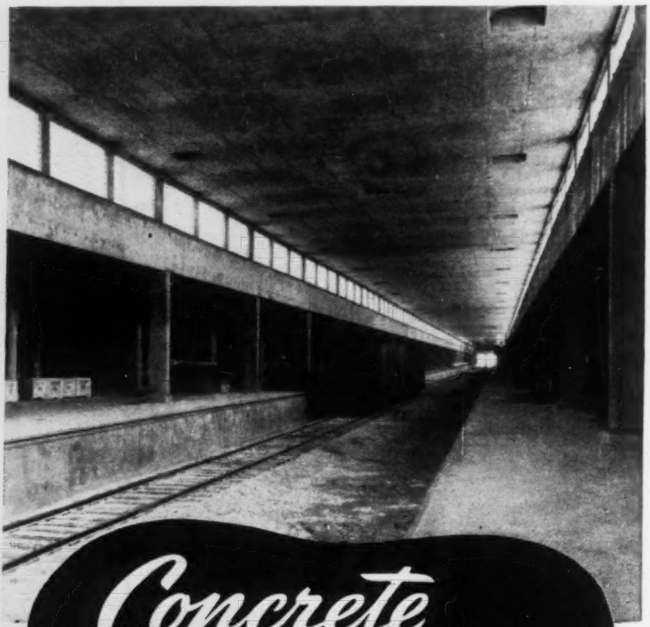
All makes—intelligently repaired and regraduated by Factory Experts.

The finest work at the LOWEST POSSIBLE COST. Reliability and guaranteed work. A special Souvenir Plumb Bob sent gratis to graduate Civil Engineers.

THE Greatest ACCURACY
THE Hardest BRONZE
THE Simplest DESIGN

Buff & Buff Company
Jamaica Plain, Massachusetts

17-acre all-concrete warehouse for U. S. Army; 1400 x 540 ft. Architects: Mills, Rhines, Bellman and Nordhoff, Toledo. Engineer: R. C. Reese, Toledo. Contractors: Skilken Bros., Columbus, Ohio.



Concrete
can help conserve steel
and transportation

The Portland Cement Association's technical staff is available to assist war construction designers and builders to—

Get adequate designs, using a minimum of steel—often no steel;

Reduce the burden on transportation facilities.

A storehouse of data, gathered through a quarter of a century of laboratory research and field study, is ready to help solve concrete war construction problems. Recent developments in design greatly reduce or eliminate the need for steel in pavements and many structures. Improved structural designs often reduce concrete quantities without lessening strength, serviceability or hazard protection.

Because the bulk of concrete material is usually available locally, the burden on transportation is reduced.

Our specially trained staff of technicians is ready to aid engineers, architects and contractors to get the maximum service which concrete can render on all types of war construction.

PORTLAND CEMENT ASSOCIATION
Dept. 8-13, 33 W. Grand Ave., Chicago, Ill.

★

BUY WAR SAVINGS BONDS

INDEX TO ADVERTISERS ALPHABETICAL

AIR REDUCTION SALES COMPANY 8
ALUMINUM COMPANY OF AMERICA 17
AMERICAN CREOSOTING COMPANY 21
AMERICAN INDUSTRIES SALVAGE COMMITTEE . . 2 and 3
AMERICAN PAULIN SYSTEM 24
AMERICAN STEEL & WIRE COMPANY . . . *Back Cover*
(United States Steel Corporation subsidiary)
ARMCO DRAINAGE PRODUCTS ASSOCIATION . . . 23
BAKELITE CORPORATION . . . . 14 and 15
BARRETT DIVISION, ALLIED CHEMICAL & DYE CORPORATION 25
BUFF AND BUFF COMPANY 31
PHILIP CAREY MANUFACTURING COMPANY . . . 31
CARNEGIE-ILLINOIS STEEL CORPORATION . . 4 and 5
(United States Steel Corporation subsidiary)
CAST IRON PIPE RESEARCH ASSOCIATION 13
CELOTEX CORPORATION 22
ELECTRO METALLURGICAL COMPANY 29
INTERNATIONAL NICKEL COMPANY, INC. 1
IRVING SUBWAY GRATING COMPANY, INC. . . . 28
KEUFFEL & ESSER COMPANY 12
LAYNE & BOWLER, INC. 26
LINCOLN ELECTRIC COMPANY . . . . . . *Third Cover*
LOCK JOINT PIPE COMPANY 6
MACARTHUR CONCRETE PILE CORPORATION . . . 10
PORTLAND CEMENT ASSOCIATION 32
RAYMOND CONCRETE PILE COMPANY . *Second Cover*
SERVICISED PRODUCTS CORP. 30
SPENCER, WHITE & PRENTIS, INC. 24
TIMBER ENGINEERING COMPANY 7
UNION CARBIDE AND CARBON CORPORATION . . . . 14, 15 and 29
UNION METAL MANUFACTURING COMPANY 19
U. S. PIPE & FOUNDRY COMPANY 27
U. S. STEEL CORPORATION SUBSIDIARIES . . . . 4, 5 and *Back Cover*
WEST DODD LIGHTNING CONDUCTOR CORPORATION 20

Index to Products Shown on Pages 30 and 31

Wanted urgently:

STEEL SCRAP

Shortage of steel scrap is threatening the war-production program.

If ships, planes, tanks and guns are to be produced in the volume needed to win the war, the country's steel-making facilities must operate at full capacity. But the plain truth is that the steel scrap to support continued capacity operations is not available, and not in sight.

United Effort Will Do the Job

Thanks to the construction of new blast furnaces, the deficiency is being partly made up by using more pig iron in steel-making. But tremendous quantities of additional scrap must be found within the crucial next few months.

Actually, many thousands of tons of steel scrap are potentially available *if only they can be gathered in.* This scrap, needed so urgently in the war effort, is scattered through the industrial plants, mines and railways, the farms and the homes of the nation. The problem is to collect it and get it moving to the steel mills. Everyone must help. If everyone will, there will be scrap to meet the needs of the war-production program.

Make a checkup in your plant or warehouse, or any other property you own or manage, and in your home.

Have any odds and ends of steel or iron that may be lying around collected. If you have any obsolete or idle equipment, machinery, or parts—anything that's made of iron or steel and isn't really needed—junk it, and get the scrap moving toward the steel mills.

How to Put Your Scrap to Work

Some iron or steel now lying rusting and forgotten around your property may help to save the lives of Americans in the battle areas. Gather up every possible bit of iron and steel scrap. Sell it to a local junk dealer, or get in touch with your local scrap salvage committee. Put your scrap to work for your country. It's needed, now!

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

UNIV. OF ILL.
(B.S. in Civ. Eng.)

McCarthy, William Joseph	(21)

IOWA STATE COLL.
(B.S. in C.E.)

Cooper, Wilson Henry	(21)
Hogen, Lowell Eugene	(21)
Ossian, Orville Rutherford	(22)
Schwitters, David Floyd	(28)

KANS STATE COLL.
(B.S. in Civ. Eng.)

Gillmore, Neil David	(30)

UNIV. OF KY.
(B.S.C.E.)

Delaney, James Ernest	(23)
Sabo, Dan	(22)
Spare, Albert Joseph, Jr.	(25)

MICH. COLL. OF MIN. & TECH.
(B.S. in Civ. Eng.)

Riesterer, Joseph Albert	(23)

UNIV. OF MICH.
(B.S.E.)

Bengal, Vernon Charles	(22)
Nagel, John Theodore	(23)

(B.S. in Civ. Eng.)

Hassan, Ibrahim Mohamed (Also B.S. in Geodesy and Surveying)	(31)

UNIV. OF MINN.
(B.C.E.)

Person, Burton Rodney	(21)

UNIV. OF MISS.
(B.S.C.E.)

Furgiuele, Albert William	(28)

COLL. OF CITY OF N.Y.
(B.C.E.)

Alvy, Reuben Ralph	(20)
Phillips, Harry Irving	(20)
Rosenholtz, Julius Frank	(21)

N.Y. UNIV.
(B.C.E.)

Danner, Alfred Emil	(25)
Farr, John Baird	(26)
Goetz, Harvey John	(24)
Schoerpner, Milton Harry	(25)

N.DAK. AGRI. COLL.
(B.S. in C.E.)

Sether, Irving Jerome	(21)

UNIV. OF N.DAK.
(B.S. in C.E.)

Horton, Kent Howard	(21)

NORTHWESTERN UNIV.
(B.S. in Civ. Eng.)

Cole, Chester Henry	(32)
Love, Joseph Eugene, Jr.	(22)
Nicoloff, George Boris	(22)

OHIO STATE UNIV.
(B.C.E.)

Marsh, Ralph Edward	(22)

OKLA. A. AND M. COLL.
(B.S. in C.E.)

Phelps, Joe Elton	(22)
Whitenton, Robert Marshall	(21)

UNIV. OF PA.
(B.S. in C.E.)

Bender, Leon	(23)

RENS. POL. INST.
(B.C.E.)

Krehbiel, Theodore Alfred	(22)

RICE INST.
(B.S. in Civ. Eng.)

Bickel, Robert Erwin	(23)

UNIV. OF S.C.
(B.S. in C.E.)

Mobley, Clarence Fowler	(21)

S.DAK. STATE COLL.
(B.S. in Civ. Eng.)

Bowman, Charles Rudolph	(22)
Johnson, Carl Robert	(21)
Kindelspire, Wayne George	(23)

SO. METHODIST UNIV.
(B.S. in C.E.)

Honeycutt, Frank Gilbert, Jr.	(23)

STANFORD UNIV.
(A.B.)

Worthen, Frederick Richard	(21)

UNIV. OF TENN.
(B.S. in Civ. Eng.)

Mintzer, Olin Wesley, III	(26)

UNIV. OF TEX.
(B.S. in C.E.)

Aubel, Henry Thomas	(22)
Bills, Samuel Edward	(28)
Calderon, Hector Miguel	(23)
Carmichael, Jack Charles	(23)
Carr, George Drexell, Jr.	(25)
Christoffel, Lewis Wilson	(23)
Darr, Oscar Vernon	(24)
Davenport, George Follin, Jr.	(31)
Felgar, Robert Pattison, Jr.	(23)
Grimes, Edwin Matthew	(27)
Janes, Ralph Emerson, Jr.	(22)
Keith, John Wilbur, Jr.	(21)
Lawler, Charles Alton	(21)
Medina, Antonio Jose	(25)
Nixon, Victor Lewis	(26)
Pedretti, Juan Pablo	(27)
Peeler, Lawrence Franklin	(25)
Richardson, Frank William	(24)
Settles, Theodore Homer	(22)
Simpson, John Weldon	(22)

(B.S. in A.E.)

Clark, John Franklin, Jr.	(24)

UNION COLL.
(B.S. in C.E.)

Robinson, Theodore Dusenbury, II	(25)

VANDERBILT UNIV.
(B.E.)

West, James Culbert	(21)

UNIV. OF VT.
(B.S. in C.E.)

Holden, Katharine Clement (Miss)	(21)
Stephen, James Humphrey	(22)

WASH. STATE COLL.
(B.S. in C.E.)

Arntson, James Eric	(22)

WASHINGTON UNIV.
(B.S. in Civ. Eng.)

Bailey, John Joseph, Jr.	(21)
Collignon, Robert Fairbanks	(29)
Hammel, Lynd Julian	(21)
Lewald, Charles Eames	(21)
Poertner, Herbert George	(21)
Stewart, Charles Harrington, Jr.	(22)

UNIV. OF WASH.
(B.S. in C.E.)

Allen, Lloyd Edmund	(23)
Clough, Ray William	(22)
Cole, Richard Joseph	(22)
Crocheron, John Logan	(23)
Eng, Kai Wah Gerald	(21)
Gallagher, Walter Lloyd	(23)
Garrison, Gerald Ray	(20)
Jantz, Walter	(27)
Louie, Sing Hon David	(24)
Moore, Howard Eugene	(22)
Moore, Robert Jerome	(23)
Powers, Alfred Leslie	(22)
Rice, Robert	(27)
Twelker, Neil Henry	(21)
Wartelle, Robert George	(22)

W.VA. UNIV.
(B.S.C.E.)

Feller, Richard Tabler	(23)

UNIV. OF WIS.
(B.S. in Civ. Eng.)

Berzowski, Roman Clemens	(22)

UNIV. OF WYO.
(B.S. in Civ. Eng.)

Albert, Gus Martin	(25)
Bowers, Charles Edward	(22)
Call, Max Ellis	(21)
Cronin, Bernard Francis	(23)
Given, Willard Warren	(22)
Isenberger, Claude James	(23)
Keller, Pleas A.	(25)
Kennedy, Robert Stewart	(22)
McLaughlin, Murray David	(25)
Pappas, Angelo	(22)
Rhoads, Russell Robert	(23)
Scott, Albert Eugene	(27)
Stultz, Darrell William	(28)

The Board of Direction will consider the applications in this list not less than thirty days after the date of issue.

Engineering Societies Personnel Service, Inc.

NEW YORK	CHICAGO	DETROIT	SAN FRANCISCO	BOSTON
31 W. 39TH ST.	211 W. WACKER DR.	FARNSWORTH AVE.	57 POST ST.	4 PARK STREET

The items listed below have been furnished by the Engineering Societies Personnel Service, Inc., which is under the joint management of the Four Founder Societies. This service is available to members and is operated on a cooperative, non-profit basis. In applying for positions advertised by the Service the applicant agrees, if actually placed in a position through the Service as a result of these advertisements, to pay a placement fee in accordance with the rates as listed by the Service. These rates have been established in order to maintain an efficient, non-profit personnel service and are available upon request. This also applies to registrants whose notices are placed in these columns. All replies should be addressed to the key numbers indicated and mailed to the New York Office.

A weekly bulletin of engineering positions open is available to members of the cooperating societies at a subscription of $3 per quarter or $10 per annum, payable in advance.

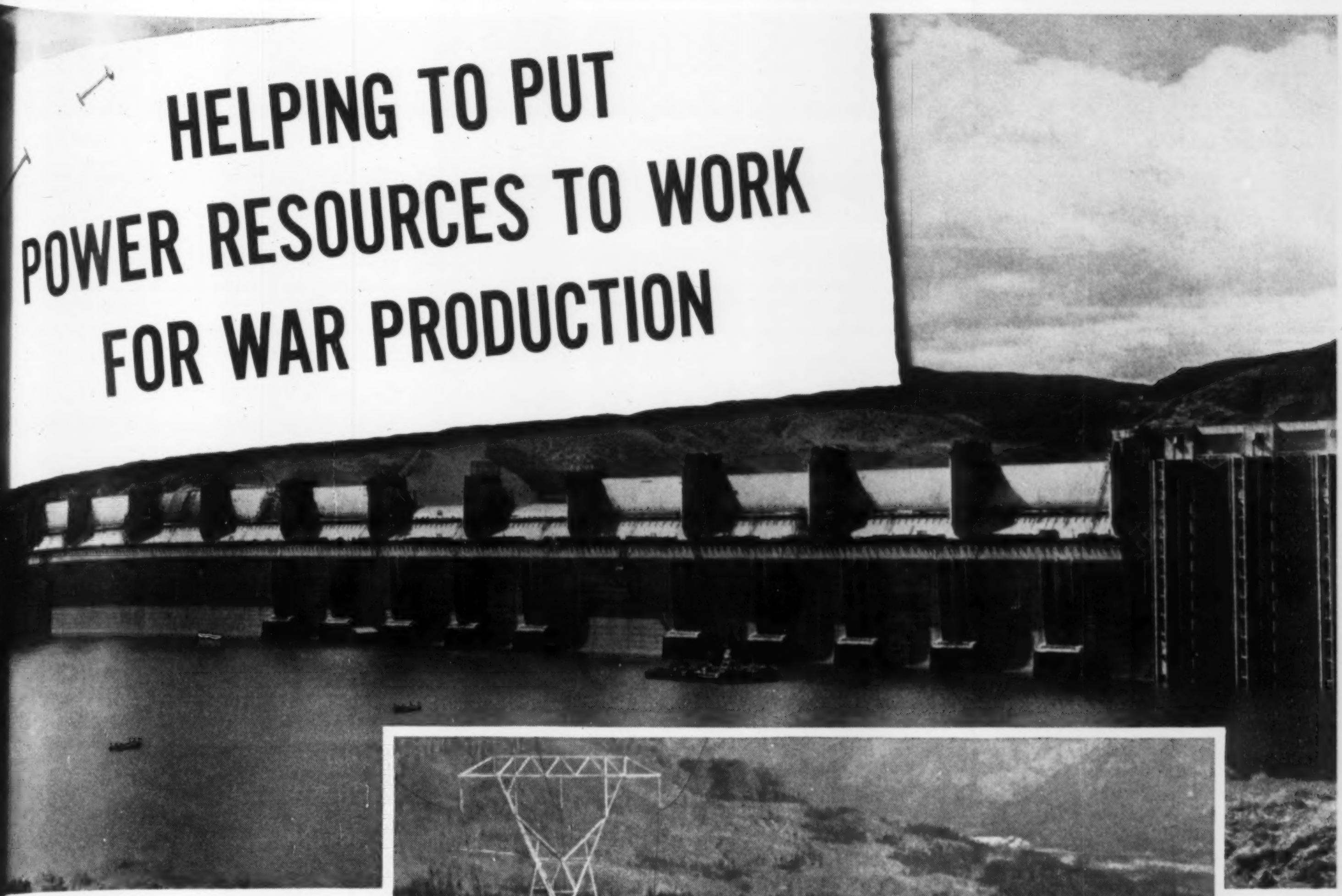
MEN AVAILABLE

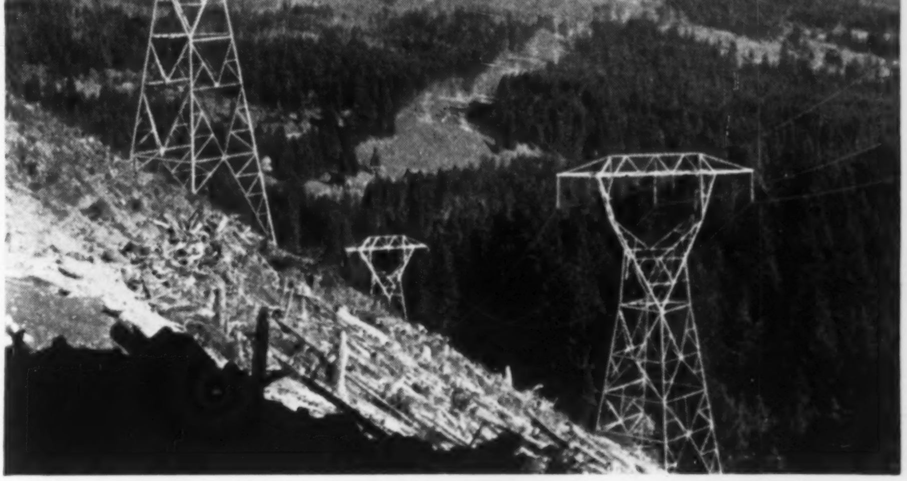
CIVIL ENGINEER; Jun. Am. Soc. C.E.; 24; married; B.S. in C.E., Texas A. & M. College, 1940; speaks and writes Spanish; Mexican citizen; licensed in Mexico. Experience, 4 months' soil testing with Texas Highway Department; 1$^1/_2$ years' designing and inspecting building for American company; desires position anywhere with heavy construction company. C-934.

INSTRUCTOR; Assoc. M. Am. Soc. C.E.; desires position as assistant professor of surveying or sanitary engineering; several years' teaching surveying and drawing. Master's degree and some teaching in sanitary engineering. C-935.

SANITARY ENGINEER; M. Am. Soc. C.E.; B.E. degree in C.E.; married; desires position teaching sanitary engineering and allied subjects; 24 years' experience in major sanitary engineering work. Have had considerable experience in lecturing before university students; now employed but wish to enter teaching profession. Location preferred, continental United States. C-936.

CIVIL ENGINEER; M. Am. Soc. C.E.; technical graduate; licensed; 30 years' experience in de-





HELPING TO PUT POWER RESOURCES TO WORK FOR WAR PRODUCTION

AMERICA is fortunate to have entered this war with so many key power projects complete or near-complete. Throughout the nation, as gigantic new war plants have sprung from open fields, production has been sparked into swift activity by a ready source of electrical energy. Whatever the source of power—whether steam or hydraulic—the important thing is it's *ready* to help industry equip and maintain a victorious fighting force.

Fabricated steel structures built by American Bridge are helping to put power resources to work for war production.

Hundreds of steel gates of all types—tainter, rolling, lift and swing—are impounding the waters of many rivers. They harness the flow to control floods, extend navigation to upper reaches, and generate electrical energy.

Thousands of steel towers dot the continent, carrying power lines that radiate from sources of energy to industrial communities and to essential war industries that have mushroomed throughout all sections of the nation. These transmission towers were designed to carry heavy-duty power lines under extreme climatic conditions and to traverse every imaginable type of terrain — deserts, valleys, plains and mountains. Their efficiency has been tested by subjecting full-size "pilot" towers to duplicated field loading conditions in our Test Frame, the largest in the country.

Just as many of the projects we have completed in recent years are serving the war effort in various ways, now all of our resources of equipment, engineering talent, and specialized "know how" are active in projects directly essential to war.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit · Duluth
Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

sign, construction, administration. Special experience with the federal government and on general municipal work, bridges, buildings, highways, wharves, war construction. Available September first. Baltimore or Philadelphia preferred. C-937.

Civil Engineer; M. Am. Soc. C.E.; consultant in management, administration, and organization; consultant in the planning and construction of public and private works projects; also construction executive and administrative officer; capable and reliable. C-938.

Positions Available

Valuation Engineers, mechanical, electrical, or structural. Should have RCN appraisal engineering experience or any experience along similar lines. Salaries, $4,200–$4,500 a year. Location, Texas. W-536.

Instructor for civil engineering department. Will teach surveying courses, including plans and topographic surveying, route surveying, a brief treatment of astronomy and astronomical observations, curves, and earthwork, and topographic drawing. Ability to teach hydraulics desirable. Salary open. Location, New England. W-540.

Structural, Architectural, Mechanical Designers, and Draftsmen, graduates in the steam and chemical field, as well as water and sewerage. Also reinforced concrete and timber designers. Salaries to $4,680 a year. Duration, six months. For man capable of taking charge of a squad on industrial building work, $5,200–$5,720 a year. Location, Arkansas. W-549.

Commissions in the Army of the United States as Second Lieutenant, over 35 years; First Lieutenant, over 40; or Captain, over 45. Should have had experience in the construction of piers, wharves, docks, and ship-loading facilities; in port operation, especially in expediting the passage of supplies and equipment from train to ship and vice versa in maintenance, alterations, and utilities operation of cities and towns for assignment as post, camp, and station utilities officers. Headquarters, New York, N.Y. W-629.

Structural Designer and Structural Draftsman. Should be experienced in mill-building construction. Salary, $3,120 a year plus overtime. Location, New York, N.Y. W-661.

Civil Engineers, 40–45, qualified to supervise survey and topographical work and to make soil boring tests and load tests. Should have had several years' definite experience in field layout for the construction of iron and steel plants and civil engineering work pertaining to the installation and erection of equipment for such plants. Location, northern South America. W-687.

Structural Designer and Draftsman. Should also know reinforced concrete. Temporary. Location, Maryland. W-859.

Safety Engineer, either mechanical, electrical, civil, or chemical engineering graduate. Salary, $3,600–$4,200 a year. Location, Mississippi. W-867.

Instructor in Civil Engineering to teach surveying; possibly engineering problems and mechanics. Master's degree preferred, but will consider B.S. Salary, $1,500–$2,000 a year. Location, Tennessee. W-934.

Civil Engineer who, although a recent graduate, has preferably had some experience in state, regional, or local planning, will be considered. Good opportunity. Permanent. Salary, $2,400 a year. Location, South. W-938.

Assistant Professor for civil engineering department to teach hydraulics and take charge of the hydraulic laboratory and, possibly, of a small class in undergraduate sanitary laboratory. Salary, $2,500–$3,000 a year. Location, New York, N.Y. W-945.

Instructor and Assistant Professor for civil engineering department. (*a*) Assistant Professor to teach surveying, railway and highway engineering, geodesy, photogrammetry, and allied subjects. Salary, $3,000–$3,600, depending upon qualifications. (*b*) Instructor to teach basic courses such as elementary surveying, mechanics, strength of materials, materials testing, and hydraulics laboratory. Salary, $2,100–$2,600, depending upon qualifications. Location, New York, N.Y. W-946.

Structural Designers for temporary position designing elevator equipment for ships. Three months' work. Salary, $3,000–$3,600 a year. Location, New Jersey. W-948.

Engineers, should assume single status. (*a*) Marine Draftsman; salary, $3,120 a year. (*b*) Chief of Party; salary, $2,828.80 a year. (*c*) Instrumentmen; salary, $2,412.80 a year. (*d*) Project Cost Engineer; salary, $5,200 a year. Location, foreign. W-956.

Engineers, should assume single status. (*a*) Record and Progress Engineer. (*b*) Draftsmen. (*c*) Designers. (*d*) Design Draftsmen. (*e*) Office Engineer. (*f*) Assistant Project Engineer. (*g*) Project Cost Engineer. (*h*) Field Engineer. (*i*) Chief of Party. (*j*) Instrumentmen. Location, foreign. W-958.

Engineers, should assume single status. (*a*) Chief of Party. (*b*) Transitmen. (*c*) Recorders. (*d*) Fathometer Operator. (*e*) Sounder. (*f*) Computer. (*g*) Draftsmen. (*h*) Draftsman. (*i*) Construction Engineer. (*j*) Office Engineer. (*k*) Engineering Inspector. (*l*) Senior Inspector. (*m*) Inspectors on concrete construction. (*n*) Inspector on reinforcing steel. Location, foreign. W-959.

Instructors for department of civil engineering. (*a*) Instructor with experience in the field to teach hydraulics, water supply and sewerage, hydraulic laboratory, and one or two sections of surveying for the duration. (*b*) Instructor to teach analytic mechanics, mechanics of materials, materials of engineering, reinforced concrete, and materials testing laboratory. Permanent. Salaries, about $2,100 a school year. Location, Pennsylvania. W-964.

Field Engineer experienced in industrial plant construction, both building and mechanical equipment. Must be able to interpret drawings and designs and layout work in the field. Salary, $3,900 a year. Headquarters, Ohio. W-1025.

Draftsman, civil engineer, with some experience in subsurface utilities, such as water lines, electric service, etc. Salary, $2,400 a year. Location, New York Metropolitan Area. W-1027.

Designers and Draftsman, including Squad Leaders and Chief Draftsmen, architectural, electrical, mechanical, structural, for work on large manufacturing plant. Duration, about one year to 18 months. Salary, $3,000–$5,400 a year. Location, Tennessee. Interviews in the East. W-1039.

Construction Superintendents for a large housing project; frame construction. Salary open. Temporary. Location, New York State. W-1049.

RECENT BOOKS

New books of interest to Civil Engineers donated by the publishers and filed in the Engineering Societies Library, or in the Society's Reading Room, will be found listed here. The notes regarding the books are taken from the books themselves and are edited by members of the staff of the Society or of the Library. Those books which are in the Library may be borrowed by mail by Society members for a small handling charge.

American Planning and Civic Annual. Edited by Harlean James. American Planning and Civic Association, Washington (901 Union Trust Building), 1941. 292 pp., illus., diagrs., 9 × 6 in., cloth, $3 ($2 to members of the Association).

A record of recent civic advance in the fields of planning, parks, housing, and neighborhood improvement. The volume includes the principal papers presented at the National Conference on Planning and the Mississippi Valley Meeting of the National Conference on State Parks held, respectively, in May and June 1941.

American Standard Definitions of Electrical Terms. Sponsored and published by the American Institute of Electrical Engineers, 33 West 39th Street, New York, 1942. 311 pp., 11 × 8 in., cloth, $1 in the United States and Canada (if ordered from Canadian Engineering Standards Association), and $1.25 elsewhere.

This glossary represents an important step in standardizing many of the terms commonly used in electrical literature. The field of electrical engineering is divided into various groups and subsidiary sections, and the terms are arranged accordingly, thus permitting ready comparison of closely related terms. The definitions have been approved by the American Standards Association and the Canadian Engineering Standards Association.

Calculus for Practical Engineers. By A. Cibulka. Distributors, Hemphill's Book Store, Austin (Tex.), 1942. 100 pp., diagrs., tables, 12 × 9 in., paper, $3.

A concise presentation of the fundamentals of differential and integral calculus, illustrated by numerous practical examples.

Elementary Structural Analysis and Design, Steel, Timber, and Reinforced Concrete. By L. E. Grinter. Macmillan Company, New York, 1942. 383 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, $3.75.

A brief, simple treatment of the subject, intended for students of architecture and mechanical and electrical engineering and others interested in buildings and miscellaneous structures, but not in bridge design. While greatest emphasis is placed on steel structures, considerable attention is given to reinforced concrete, and timber is treated adequately. Special chapters on timber roof trusses and on column footings are included.

Great Britain, Ministry of Home Security, Home Security Circular No. 75/1942. **Shelter Design and Strengthening—Consolidating Circular.** His Majesty's Stationery Office, London, 1942. 21 pp., diagrs., $13 \times 8^1/_2$ in., paper. (Obtainable from British Library of Information, 30 Rockefeller Plaza, New York, 30 cents.)

Modified designs for "standard" shelters are given, which afford a much greater degree of protection at small increase in cost. Methods of strengthening existing shelters are also described.

Hydrology. (Physics of the Earth—IX.) Edited by O. E. Meinzer. McGraw-Hill Book Co., New York and London, 1942. 712 pp., illus., diagrs., charts, maps, tables, 10 × 7 in., cloth, $7.50.

This is the final volume of a series of monographs prepared under the direction of a committee of the National Research Council. The series covers the physics of the earth and aims "to give to the reader, presumably a scientist but not a specialist in the subject, an idea of its present status, together with a forward-looking summary of its outstanding problems." The present volume on hydrology first describes the two basic processes—precipitation and evaporation. The processes of storage and transfer of the water are then treated at length and followed by a chapter on the physical and chemical work done by the natural waters in the course of their circulation. There are also chapters on the hydrology of limestone and lava-rock terranes. Each chapter has a bibliography.

Industrial Camouflage Manual. By K. F. Wittmann. Reinhold Publishing Corporation, New York, 1942. 128 pp., illus., diagrs., tables, $11 \times 8^1/_2$ in., paper, $4.

This interesting book presents experiments and experiences developed in the classrooms and camouflage laboratory of Pratt Institute. The presentation is largely by means of drawings and photographs. Principles, methods, and materials are described and demonstrated on models and by actual installations.

Introduction to the Theory of Elasticity for Engineers and Physicists, 2 ed. By R. V. Southwell. Oxford University Press, New York, 1941. 509 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, $10.

The first edition, which appeared in 1936, was intended as a text for students pursuing advanced studies in elasticity and for engineers who needed a wider knowledge of elastic theory than was demanded formerly, to deal with the problems arising from higher speeds in machinery, the use of light metals in structures, etc. This edition is substantially a reproduction of the first, with the correction of a few errors and some minor additions.

Structural Theory, 3 ed. By H. Sutherland and H. L. Bowman. John Wiley & Sons, New York; Chapman & Hall, London, 1942. 368 pp., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, $3.75.

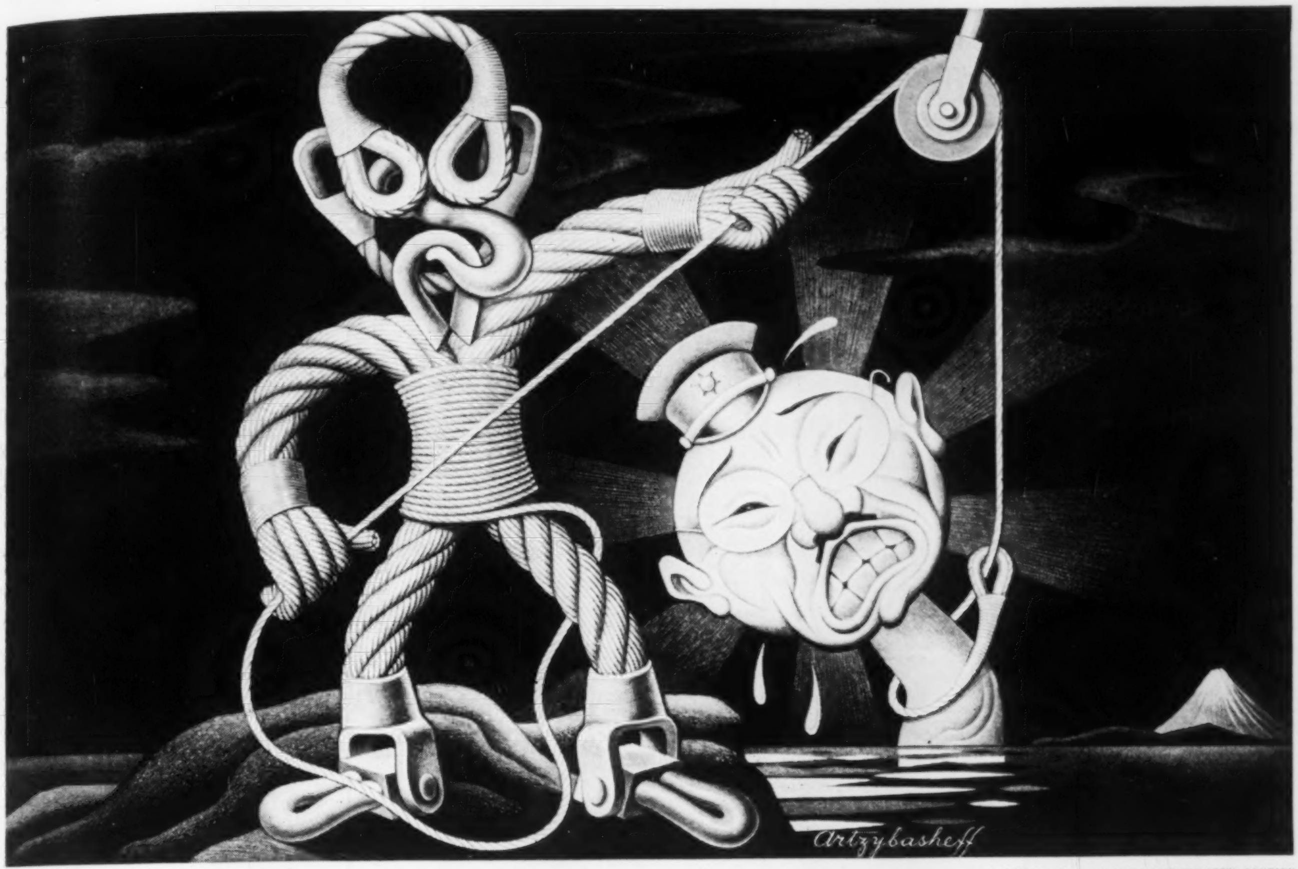
The basic conceptions and principles of structural theory relating to trusses, rigid frames, and space frameworks are presented in this textbook, which covers the subject as commonly taught in our technical schools. In this edition there has been considerable revision and enlargement of the parts devoted to rigid-frame construction and, to a lesser extent, of other sections.

Thorpe's Dictionary of Applied Chemistry, Vol. 5, 4 ed. By J. F. Thorpe and M. A. Whiteley. Longmans, Green & Co., London, New York, Toronto, 1941. 610 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., leather, $25. (70*s*.). Abridged Index to Vols. 1–5 of new edition of Thorpe's Dictionary of Applied Chemistry, paper, $1.

The fifth volume of this standard encyclopedia of chemical technology contains monographs on various important subjects. Fermentation, fertilizers, fibers, the finishing of textile fabrics fireproofing, food preservation, fuel, the gas industries, and glass are given extensive treatment. Minor topics are also covered adequately. The book is indispensable in chemical and technical libraries.

United States Tennessee Valley Authority, The Chickamauga Project. (Technical Report No. 6.) Tennessee Valley Authority Treasurer's Office, Knoxville, Tenn., 1942. 451 pp., illus., diagrs., charts, maps, tables, $9^1/_2 \times 6$ in., cloth, $1.

Facts concerning the planning, design, construction, and initial operations of the Chickamauga project of the Tennessee Valley Authority are presented in this report. Unusual and unprecedented features and methods are described in some detail, while common procedures and practices receive rather brief treatment. Chapter bibliographies, a section on costs, and a statistical summary are included.



POSTER REPRODUCTIONS AVAILABLE ON REQUEST. SEE COUPON.

COPYRIGHT 1942, WICKWIRE SPENCER STEEL COMPANY

YOU CAN HELP DO THIS JOB

Your country needs all possible steel for guns, tanks, ships and shells. All the *wire rope* that can be produced is needed for military and naval uses—and to speed war production in scores of industries. You can serve your country by taking care of *your* wire rope, so that replacement is postponed as long as possible.

FREE BOOK TELLS HOW

It illustrates and describes more than forty ways to *save money* on wire rope. The big pictures of right and wrong ways make it easy to spot sources of too rapid wear—and *correct* them.

Many thousands of wire rope users throughout the world use this handy book as their guide to longer wire rope life. Now, with urgent war needs for steel and wire rope, it is doubly important that every wire rope user have a copy.

If you *must* have new wire rope to maintain uninterrupted war production, help us to help you by anticipating your needs as far in advance as possible, within priority regulations.

Know Your Ropes

WICKWIRE

WISSCO PRODUCTS

WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City.

MAIL THIS COUPON

Wickwire Spencer Steel Company
500 Fifth Avenue, New York, N. Y.

☐ Send free copy of the book, "Know Your Ropes."

☐ Send........free posters, 21" wide, of illustration at top of this page. No advertising appears, merely prize-winning title, "I Pull with Uncle Sam."

Name..

Company..

Address..

CURRENT PERIODICAL LITERATURE

Abstracts of Articles on Civil Engineering Subjects from Publications (Except Those of the American Society of Civil Engineers) in this Country and Foreign Lands

Selected items for the current Civil Engineering Group of the Engineering Index Service, 29 West 39th Street, New York, N.Y. Every article indexed is on file in The Engineering Societies Library, one of the leading technical libraries of the world. Some 2,000 technical publications from 40 countries in 20 languages are received by the Library and are read, abstracted, and indexed by trained engineers. With the information given in the items which follow, you may obtain the articles from your own file, from your local library, direct from the publisher, or they may be borrowed from the Engineering Societies Library. Photoprints will be supplied by this library at the cost of reproduction, 25 cents per page to members of the Founder Societies (30 cents to all others), plus postage, or technical translations of the complete text may be obtained at cost.

BRIDGES

CONCRETE ARCH, PHILADELPHIA. Famous Concrete Bridge Has No Reinforcement in Arches and Spandrels. *Concrete*, vol. 50, no. 7, July 1942, p. 4. Brief description of notable structure of this type—Walnut Lane Bridge—built in 1906 in Philadelphia; after 36 years of service, structure remains in excellent condition; main arch has clear span of 233 ft and rise of 73 ft and is made up of two rings, each 21 ft 6 in. wide and 9 ft 6 in. thick at springing line.

CONCRETE FRAME, DETROIT, MICH. Concrete Bridges Over New Traffic Artery Untangle Congestion in Detroit. *Concrete*, vol. 50, no. 7, July 1942, pp. 2–3 and 39. Major grade-separation project in Detroit and Highland Park includes construction of seven bridges or grade-separation structures of reinforced-concrete rigid-frame type; important details of design and construction described.

CONCRETE SLAB, QUEBEC. Underline Railway Bridge in Canada. *Concrete & Constr. Eng.*, vol. 37, no. 6, June 1942, pp. 211–214. Illustrated description of pre-cast concrete-slab bridge built to carry double lines of Canadian National Railways and replace existing steel bridge; it is believed that these pre-cast units are larger and heavier than any yet used, each unit weighing approximately 270,000 lb.

CONSTRUCTION, CALIFORNIA. Railway Diversion and Pit River Bridge, California. *Engineer*, vol. 173, no. 4503, May 1, 1942, pp. 371–374. Illustrated description of diversion which involves driving of twelve tunnels and erection of eight bridges, and is seven miles shorter than old track; details of Pit River highway and railway steel truss bridge. See also *Engineering Index* 1941, pp. 163 and 995.

DESIGN. Lack of Material Forcing Engineers to Adopt Unusual Bridge Design, F. W. Panhorst. *Calif. Highways & Pub. Works*, vol. 20, no. 2, Feb. 1942, pp. 2–4 and 16. Review of designs using mass concrete, to save reinforcing steel; use of discarded railroad rails as substitute for reinforcing concrete; re-design of expansion details to eliminate steel; timber superstructures used.

FLOORS. "Sealed" Wood Deck Construction. *Roads & Streets*, vol. 85, no. 6, June 1942, p. 41. Longer service life and greater loading capacity are two advantages claimed for new system of wood deck construction, developed and applied during past six years to bridges of Fresno County, California.

HIGHWAY, CLEVELAND, KY. Kentucky Builds High Bridge, E. D. Smith. *Eng. News-Rec.*, vol. 129, no. 1, July 2, 1942, pp. 25–27. Description of bridge under construction at Kentucky River crossing of U.S. 25 at Cleveland, Ky., with design height of 250 ft above normal pool level, and maximum pier height of 198 ft; pier will be double column with connecting web wall for first 90 ft, then two individual columns for 68.5, topped out by double column joined by web member for remaining height of 11 ft; bridge will shorten U.S. 25 by 1.50 miles and eliminate six curves and 8,000 ft of 7% grade.

PONTOON, PRAIRIE DU CHIEN, WIS. Prairie Du Chien Pontoon Bridge, A. E. Miller. *Ry. & Locomotive Historical Soc.—Bul.*, no. 58, May 1942, pp. 46–54, 2 supp. plates. Entire length of bridge when first built was 8,000 ft, crossing both channels of Mississippi and intervening island; two original Mississippi pontoons provided clearance of 409 ft each and offered facilities for passage of 1,000 cars per day, average then being about 3,000 per day, according to reports; illustrations given.

RAILROAD, QUEBEC. New Railway Bridge, Dorval, Canada. *Civ. Eng.* (London), vol. 37, no. 428, Feb. 1942, pp. 32–34. Illustrated description of railroad bridge over highway at Dorval, constructed and rolled into place without interrupting highway traffic; span is 117 ft $6^{3}/_{4}$ in. long and is built of two girders on 31-ft centers; total weight of completed span is 1,600,000 lb.

BUILDINGS

BOMBING EFFECT. Effect of Blast on Buildings, A. Haertlein. *Boston Soc. Civ. Engrs.—J.*, vol. 29, no. 2, Apr. 1942, pp. 71–81. Blast defined as compression and suction waves set up by detonation of high explosive; experiences and lessons learned from a study of blasts originating from sources other than bombs are presented as basis for study of effects of blasts caused by bombs; wind stresses; earthquake effects; frame buildings found to endure blast forces most successfully.

CITY AND REGIONAL PLANNING

POST-WAR. Better Cities After War, C. S. Ascher. *American City*, vol. 57, no. 6, June 1942, pp. 55–57. Some conceptions that must underlie concerted effort to remake our American cities after war as set forth in pamphlet presented by National Resources Planning Board.

POST-WAR LONDON. Higher London Skyline, J. A. Wilson. *Civ. Eng.* (London), vol. 37, no. 431, May 1942, pp. 102–103. Post-war restriction of building areas to provide room for widened roads and open spaces means that buildings must be higher resulting in elevated skyline; types of buildings proposed; foundation problems; noise abatement.

POST-WAR. Replanning Great Britain. *Nature* (London), vol. 149, no. 3787, May 30, 1942, pp. 587–590. Editorial discussion of plan for establishment of Ministry of Works and Planning; report issued by Reconstruction Committee of Royal Institute of British Architects on Legislation Affecting Town and Country Planning; pamphlet by Roland Pumphrey, on Rebuilding Britain Series, No. 6; debate in House of Commons on Planning Bill, etc.

SLUM CLEARANCE. Rural-Urban Slum Elimination, J. M. Albers. *American City*, vol. 57, no. 3, Mar. 1942, pp. 43–44. Much good could be accomplished if use regulations and minimum standards of construction and of land subdivision could be applied to rural slum areas; example of town of Rock, Wis., given to show how adequate planning eliminates chief public hazards.

CIVIL ENGINEERING

HISTORY. French Civil Engineers of Eighteenth Century, S. B. Hamilton. *Engineering*, vol. 153, nos. 3980 and 3981, Apr. 24, 1942, pp. 325–326, and May 1, pp. 359–360; see also editorial discussion in no. 3978, Apr. 10, 1942, p. 292. Consideration of progress of new profession during century as divided into several periods: By foundation of Corps des Ponts et Chaussees in 1716; by organization of Ecole des Ponts et Chaussees in 1747; by appearance of Coulomb's memorable paper in 1773; and by reorganization of Public Works Services in 1791.

CONCRETE

AMMUNITION, STORAGE. Full-Scale Tests Develop Building Technique for Army's Beehive Magazines Designed by Contractor to Save Steel and Concrete. *Construction Methods*, vol. 24, no. 6, June 1942, pp. 60–62, 106, 108, 110, and 112–113. Economies of mass production in building multiple units of Corbetta "beehive" storage magazine, recently adopted by War Department as an alternate to standard semi-cylindrical, "igloo"-type magazine; economical design of beehive magazine led to acceptance of alternate plan by Ordnance Department and Corps of Engineers, U.S. Army.

CONSTRUCTION. Concrete Frames Designed to Save Steel, J. J. Polivka. *Eng. News-Rec.*, vol. 128, no. 25, June 18, 1942, pp. 981–984. Saving of steel in reinforced concrete structures can be attained through careful design and accurate analysis; still greater reductions are possible by using light-weight fillers for one and two-way slabs; for one-way slab designs, steel savings up to 47% are possible when compared with conventional designs, and with two-way construction decrease of 56% may be obtained; sample calculations show that use of fillers need not materially increase total costs.

CRACKING. Cracking of Concrete, R. W. Carlson. *Boston Soc. Civ. Engrs.—J.*, vol., 29, no. 2, Apr. 1942, pp. 98–109. Paper concerns cracks due to shrinkage from drying; cracks due to temperature effects, applied load, and expansion are not considered.

CULVERTS. Culverting River in American City. *Concrete & Constr. Eng.*, vol. 37, no. 6, June 1942, pp. 229–235. In Hartford, Conn. twin pressure conduit about 5,600 ft long, with top of its intake structure 54 ft above discharge invert, is being constructed to carry waters of Park River and prevent high water of Park or Connecticut rivers from flooding city; conduit is part of flood control works; description of concrete placing.

CURING. Use of Calcium Chloride in Concreting. *Calcium Chloride Assn.—Bul., No. 28*, 1942, 65 pp. Calcium chloride, used integrally in concrete mixes, accelerates rate of hardening of Portland cement concrete to such extent that finishing may follow placing in one-third usual time; purpose of booklet is to explain results secured by using calcium chloride in concrete and so make possible more rapid and better regulated concreting schedules.

DRYDOCKS. Building Large Graving Dock in the Dry. *Concrete & Constr. Eng.*, vol. 37, no. 6, June 1942, pp. 204–210. Illustrated description of construction of drydock 1,100 ft long by 150 ft wide at U.S. naval base; deep wells are used to control underground water, aided by well points in side slopes; protection of dock from sea afforded by break-water $2^{1}/_{2}$ miles offshore; concrete placing; small pumps for emptying dock when in use and their submersible motors are in vertical pump wells cast in concrete walls of dock. See, also, *Engineering Index* 1941, p. 334.

FLOORS. Pre-cast Concrete Warehouse Floor. *Concrete & Constr. Eng.*, vol. 37, no. 5, May 1942, pp. 167–171. In construction of warehouse and molding loft for U.S. Navy, pre-cast units were used for second story because they can be put up almost as speedily as timber framing and without requiring shoring or delay for curing needed with cast-in-place construction.

MANHOLES, COVERS. Precast Concrete Manhole Covers to Help Keep Your Products Plant Busy. *Concrete*, vol. 50, no. 5, May 1942, pp. 10–11. Details of several pre-cast concrete manhole covers are shown in drawings, taken from data sheet prepared by Portland Cement Association for information of concrete products manufacturers.

PROTECTIVE COATINGS. Protection of Cement and Concrete, E. Stern. *Paint Manufacture*, vol. 12, no. 4, Apr. 1942, pp. 63–67. Physical and chemical behavior of cement and concrete; means of protecting material against attacks of sulfate-containing soil; waterproofing; surface treatment; optical examination of concrete and cement by metallographic technique developed by author provides set of photographs of microscopic structure, which are given. (To be continued.)

REINFORCEMENT, CONSERVATION. Saving Steel in Reinforced Concrete. *Eng. & Contract. Rec.*, vol. 55, no. 24, June 17, 1942, pp. 24–25. Wartime steel restrictions have caused designers to reexamine reinforced concrete structures for possible steel economies; results are discussed.

RESERVOIRS. Council Bluffs, Iowa, Constructs Two Concrete Reservoirs. *Pub. Works*, vol. 73, no. 6, June 1942, pp. 11–12. Twin concrete reservoirs, each 106 ft in diameter, 30 ft high, and of 2,000,000-gal capacity, are replacing uncovered and structurally unsound reservoir that has supplied water to Council Bluffs, Iowa, for several years; both tanks will be 236 ft above level of town, maintaining pressure of 85 to 90 lb throughout business district; constructed with prestressed reinforcement and with flat dome roof

THE WAR CAN'T WAIT..

Donald M. Nelson says to the Construction Industry:

"Our country's war production demands huge quantities of strategic scrap materials—iron, steel, rubber, tin, zinc, copper, brass, lead, burlap, rags, and rope. We need the immediate, active cooperation of the Nation's engineers in whipping this problem. On construction jobs especially, the heavy scrap must be salvaged—conveying belts, buckets, engines, etc. We urge you to get under way *at once* with an all-out drive to round up scrap on all your jobs."

U.S. NEEDS ALL SCRAP..TODAY!

SELL YOUR SCRAP TO SHORTEN THE WAR!

HERE'S WHAT TO LOOK FOR

CONVEYORS of all kinds—bucket, fabric, rubber and fabric. Also old sheaves and pulleys. The Japs hold 97% of the world's rubber supply. Scrap rubber must see us through. Every ounce of rubber you ignore helps Hirohito and Hitler.

PUMPS, COMPRESSORS, ENGINES and their parts . . . pistons, bearings, cylinders, valves. Rout out old-style, outmoded equipment. Don't hoard this valuable scrap—it's worth its weight in Japs!

SHOVELS, BULLDOZERS, DERRICKS . . . tractor plates, rollers, and other parts . . . buckets, chains and cables. Remember—a 4,000 lb. "block-busting" bomb calls for half a ton of steel scrap. Turn in every other kind of material, too—don't let a single factory close down for lack of metal!

ROLLING STOCK . . . odd length rails, narrow gauge equipment, car wheels, axles, old batteries from electric mules. Every bit of metal is needed *right now!*

AIR TOOLS . . . paving breakers, jackhammers, drills and parts. Round everything up—no matter how small. It takes only half a pound of scrap for a hand grenade!

OLD PIPES, DRUMS, short lengths of pipe, broken rubber hose, battered grease drums, old truck tires, odds and ends of bars for reinforced concrete. A 50-lb. steel drum yields scrap enough for one .50-caliber machine gun!

HERE'S WHAT TO DO... Appoint one man as Salvage Manager for your department. Give him authority to *act*—to condemn old equipment, to move material, to collect scrap of all kinds. Have him separate all scrap by type. Then move it promptly through your regular scrap dealers. Don't wait—start rounding up scrap *now*—and keep it moving until the war is won!

THROW YOUR SCRAP INTO THE FIGHT!

This message approved by Conservation Division

WAR PRODUCTION BOARD

This advertisement paid for by the American Industries Salvage Committee (representing and with funds provided by groups of leading industrial concerns).

Reservoirs. Lining Concrete Reservoir, H. J. Cook. *New England Water Works Assn.—J.*, vol. 56, no. 1, Mar. 1942, pp. 70–75. Account of author's experience in Auburn, Me., in repairing leaky reservoir built in 1907; real causes of leaks were horizontal joints between daily runs of concrete, due to lack of knowledge of concrete construction in those days.

Roads and Streets. Permanent Traffic Stripes and Rubber-Sealed Joints Are Features of Concrete Paving Job. *Construction Methods*, vol. 24, no. 6, June 1942, pp. 42–45, 90, 92, 94, and 96. Illustrations and details of construction ob on four-lane concrete pavement marked with permanent traffic stripes of black iron oxide floated into concrete, joints sealed with hot-poured rubber compound.

Ships. Possibilities of Concrete Boat, L. Kauf. *Concrete*, vol. 50, no. 5, May 1942, pp. 2–4. Great improvements have taken place since first concrete ship, in materials—that is, concrete and reinforcing steel; this applies also to methods of design; article offers suggestions as to how, subject to further study, this progress could be embodied in design and construction of concrete boats; efficiency factor of old ships; comparative calculations; redistribution of moments; lessons from barrel shell roofs; problem of insurance classification.

DAMS

Concrete Gravity, Forms. How Absorptive Form Liner Was Utilized on Friant Dam Project, W. Waterfall. *Concrete*, vol. 50, no. 5, May 1942, pp. 18 and 29–30. Friant Dam extends 3,500 ft from end to end on crest; when it was finished, 1,500,000 sq ft of Celotex absorptive form liner material had been used to create its tough, smooth surfaces; fibrous nature and low density of absorptive form liner permit air entrapped in mix along face of form to escape directly through liner, thereby allowing aggregate and cement to fill space previously occupied by air.

FOUNDATIONS

Excavation. Improving Real Estate by Cubic Yard, J. C. Kaiser and L. E. Gray. *Excavating Engr.*, vol. 36, no. 3, Mar. 1942, pp. 143 and 170–171. Account of equipment and methods used in grading 15,000-cu yd dirt job at profit; project included stump removal, leveling, and ravine filling.

Piles, Driving. Clay and Pile Driving, G. B. Barham. *Civ. Eng.* (London), vol. 37, no. 429, Mar. 1942, pp. 61–62. Notes on difficulties to be taken into consideration when driving piles into clay soil; methods most generally used are direct bearing tests and hammer-driven test piles; soil analyses; moisture effects.

HYDROLOGY AND METEOROLOGY

Earthquakes. Cause of Earthquake, E. Tillotson. *Nature* (London) vol. 149, no. 3785, May 16, 1942, pp. 539–540. Ground vibrations are kinetic energy, which must be released consequent on disappearance of some form of potential energy; form this potential energy takes, how it is released, but more particularly how it arises is problem discussed.

Evaporation Loss. Evaporation-Loss from Land Areas, D. Lloyd. *Water & Water Eng.*, vol. 44, no. 553, June 1942, pp. 135–141. Part of hydrologic cycle in which water moves from rainfall to runoff is discussed in order to advance theory that evaporation loss occurs in two stages, from soil water and from ground water; in each of these stages direct evaporation and water, which is vaporized after being transpired by plants, are discussed; empirical formula for total evaporation loss. Bibliography.

Hydrology. Base-Exchange and Sulphate Reduction in Salty Ground Waters Along Atlantic and Gulf Coasts, M. D. Foster. *Am. Assn. Petroleum Geologists—Bul.*, vol. 26, no. 5, May 1942, pp. 838–851. Salty waters encountered in water-bearing sand along Atlantic and Gulf Coasts are characteristically lower in calcium, magnesium, and sulfate and higher in sodium than theoretical mixtures of fresh uncontaminated waters from same formations and amount of sea water indicated by chloride content of salty water; these differences in chemical composition are attributed to base exchange and reduction of sulfate.

IRRIGATION

Irrigation Canals, Earthquake Effect. Keeping Nation's Garden Green, F. S. Bixby. *Excavating Engr.*, vol. 36, no. 3, Mar. 1942, pp. 138–141 and 171–172. Account of repair and reconstruction of irrigation system in California's Imperial Valley, which was badly damaged by earthquake in 1940; resumption of water service to valley took place in about 12 days with total crop loss amounting to one cutting of alfalfa in few sections.

LAND RECLAMATION AND DRAINAGE

Airports. Three Types of Airport Drainage. *Eng. News-Rec.*, vol. 128, no. 23, June 4, 1942, pp. 906–909. Particulars of systems used on Texas fields include use of (1) French drains, (2) sawtooth drainage system, and (3) catchbasin and ponding system; data as to amount of pipe required and cost of draining field with each of types are given; advantages of three types are listed.

Arizona. Draining Cotton Fields Easy Way, F. S. Bixby. *Excavating Engr.*, vol. 36, no. 4, Apr. 1942, pp. 196–198. Fifteen-thousand acre tract under cultivation by Southwest Cotton Company at Litchfield Park, drained by making unusual use of tractor-drawn scraper; success of method described depends upon perfect timing of work to weather.

Culverts, Design. Structural Design of Flexible Pipe Culverts, M. G. Spangler. *Iowa State College Agric. & Mechanic Arts—Eng. Experiment Station—Bul. 153*, vol. 40, no. 30, Dec. 24, 1941, 84 pp. Structural behavior of flexible types of culvert pipe, such as those fabricated of corrugated metal; laboratory studies, in which corrugated metal pipes were loaded at diametrically opposite elements, were conducted, and vertical and horizontal deflections of each pipe were measured; each loaded pipe was analyzed to determine its horizontal and vertical deflections, its bending moments, and its tangential thrusts.

Landfill Refuse Disposal. War Conditions Favor Landfill Refuse Disposal, R. Eliassen. *Eng. News-Rec.*, vol. 128, no. 23, June 4, 1942, pp. 912–914. Waste-paper salvage campaigns have resulted in removal of paper from refuse, thus allowing more rapid rate of decomposition of putrescible organic matter; report of experimental results that show feasibility of use of refuse as landfill particularly at this time.

Soils, Erosion. Water-Disposal Planning Techniques, W. A. Weld. *Agric. Eng.*, vol. 23, no. 5, May 1942, pp, 152–154. Water-disposal planning technique improved during 8 years that soil-conservation program has been in operation in southeastern region of United States; for most part, changes may be attributed to broader understanding of problems involved and experience gained during that time; other phases of program have undergone progressive changes; only those phases that have bearing on water disposal are considered. Before Am. Soc. Agric. Engrs.

PORTS AND MARITIME STRUCTURES

New Zealand. Port of Greymouth, New Zealand, D. C. Milne. *Dock & Harbour Authority*, vol. 22, no. 257, Mar. 1942, pp. 73–78. Problem of bar harbor; early improvement work; later developments; breakwater construction; wave force; quarry work; bar investigation; groyne installation; effect on bar depth. From *Instn. Civ. Engrs.—J.*, date not specified.

Philadelphia, Pa. Port of Philadelphia in War Effort, E. Reybold. *World Ports*, vol. 4, no. 7, Apr. 1942, pp. 6–8. Brief historical review; characteristics and features of port; its part in war effort briefly discussed. Before Maritime Soc. of Port of Philadelphia.

PUBLIC WORKS ENGINEERING

Community Water Supplies. Relation of River Dams to Community Water Supplies, W. G. Stromquist and L. H. Clouser. *Am. Water Works Assn.—J.*, vol. 34, no. 3, Mar. 1942, pp. 367–373. Effects of Authority's dams and reservoirs on public water supplies throughout valley area are numerous and of varying complexity and technical detail; author attempts to describe methods of technical staff engaged in study of problems and their solution.

RAILROADS, STATIONS, AND TERMINALS

Wartime Transportation. Girding for Wartime Transportation. *Ry. Age*, vol. 112, no. 21, May 23, 1942, pp. 980–988. Particulars of organization set up by cooperation between railroads and government to meet emergency transport needs; activities of Assn. of American Railroads; shipper cooperation; port situation; military transportation; organization on individual railroads; operating changes.

ROADS AND STREETS

Airport Runways, Soil Cement. Soil-Cement Runways for Heavy Bombers, C. H. McLaughlin. *Eng. News-Rec.* (News Issue), vol. 128, no. 10, Mar. 5, 1942, pp. 4–5. Description of runway surfaced with soil cement mixture, 100 ft wide and 3,000 ft long with 500-ft taxiway between runway and nearby airplane plant; major operations in processing and equipment used are illustrated.

Brick. Improved Equipment Builds Monolithic Brick Pavement. *Construction Methods*, vol. 24, no. 5, May 1942, pp. 50–51, 104, 106, 108, and 110–111. Details of construction of 3.4 miles of brick paving in Ohio, with particular reference to improved equipment used; illustrations and applications of concrete mixer for subbase, brick conveyor, and vibrating machines.

Burma-China. Burma Road. *Compressed Air Mag.*, vol. 47, no. 2, Feb. 1942, pp. 6565–6566. Sketch map showing route of road from Rangoon, through Mandalay, Lashio, Pooshon, and Kunming to Chunking; also rail line from French Indo-China to Kunming, now inoperative; construction and traffic problems; proposed railroad extension from Lashio to Kunming; normally, one of chief obstacles to be overcome is malaria; importance of road for transporting military supplies to interior of China.

By-Pass. Construction of By-Pass Highway in England by Royal Canadian Engineers, J. P. Carriere. *Eng. & Contract. Rec.*, vol. 55, no. 19, May 13, 1942, pp. 8–11 and 20–23. Account of construction of by-pass connecting two main highways, one at elevation 265 and other at elevation 135; work done by army engineers consisted of grading, drainage, consolidation of fill, underpasses, bridges, and earthwork.

Canada. War Time Road Building, T. G. Morgan. *Eng. & Contract. Rec.*, vol. 55, no. 16, Apr. 22, 1942, pp. 16–19, and 27. General review of roads and highway systems being constructed throughout Canada; military access roads, and three most important highway systems stressed.

Construction. Earthwork Quantities, I. A. Cram. *Instn. Mun. & County Engrs.—J.*, vol. 68, no. 10, Mar. 31, 1942, pp. 285–293. Earthwork defined as process of excavating material from where it is not wanted and placing it where it is needed; eight types of material are mentioned with comments on their properties, uses, and best methods of handling.

Construction, History. Roadbuilding in Good Old Days, C. T. Fisher. *Eng. News-Rec.*, vol. 128, no. 21, May 21, 1942, pp. 849–852. Account of road construction carried out in New York State about 40 years ago, dealing with paving and equipment used; distinct contrast can be noted with present construction methods, highlighting present-day developments.

Curves. Vertical Curves for Two-way and One-way Roads, H. Criswell. *Roads & Road Construction*, vol. 20, nos. 229, 230, 231, and 232, Jan. 1, 1942, pp. 4–6; Feb. 2, pp. 20–23; Mar. 2, pp. 36–38; and Apr. 1, pp. 54–56. General considerations on summit and valley curves; form of vertical curves, simple and cubic parabola; symmetrical and unsymmetrical curves, location of highest and lowest point; stopping distance, tabulated data of distances required to bring vehicle to stop on dry level roads; length of simple parabolic vertical curve; tabulated data.

Design. Notes on Aesthetic Aspects of Roads, R. W. Bell. *Surveyor*, vol. 101, no. 2626, May 22, 1942, pp. 173–174. Author stresses need for practical outlook on design of roads to be built in post-war period; roads need adequate widths, directness, avoidance of densely populated districts, freedom from intersections, avoidance of low-lying areas where fog and mist may be encountered, gradients as gentle as possible, properly designed vertical and horizontal curves, roadside appearance; bridge design; road materials.

Latin-America. Survey of Highways in Latin America, B. P. Root. *Roads & Bridges*, vol. 80, no. 5, May 1942, pp. 30–32, 60, 62, 64–70, and 72. Statistical review of highways, roads, extent of their construction, materials, and general condition; progress noted.

Maintenance and Repair. Importance of Maintenance to Low-Cost Roads, B. H. Petty. *Roads & Streets*, vol. 85, no. 5, May 1942, pp. 23–27. Suggested method for best maintenance of earth, gravel, and stone roads; stabilization with chemicals, bituminous materials, and soil cement; some stabilization handicaps.

Materials Conservation. Substitutes for Critical Materials Outlined by Munitions Board. *Eng. News-Rec.*, vol. 128, no. 20, May 14, 1942, pp. 12–13. To aid state highway departments, local road commissions, and public works departments of cities in meeting prohibitions against use of critical war materials, Army and Navy Munitions Board has issued list of products commonly used by such factions with recommended substitutions; list is presented in full.

Railroad Crossings, Grade Separation. Unterfuehrung der Seestrasse in Zurich-Wollishofen, W. Burkhard. *Schweizerische Bauzeitung*, vol. 118, no. 24, Dec. 13, 1941, pp. 281–284. Underpass of Seestrasse in Zurich-Wollishofen, Switzerland; illustrated description of method of construction employed for graded curved highway under railroad crossing with roadway 9 m wide and two sidewalks each 2.5 m wide; method of constructing trough in ground water and ground-water sinking by means of filter wells; erection of new iron bridge over underpass after completion of trough walls.

Road Machinery. Notes on Use of Machinery for Construction of Concrete Roads, T. R. Grigson. *Surveyor*, vol. 101, no. 2624, May 8, 1942, pp. 155–156. Review of American and Continental practice with various types of road machines; operations in construction of road slabs to which machinery has been applied successfully; results of tests on cores drilled from machine-compacted and hand-tamped concrete.

Road Machinery. Wartime Control of Roadbuilding Equipment. *Roads & Bridges*, vol. 80, no. 5, May 1942, pp. 19–20. Pool of construction machinery guarded for essential work by system of permits; control involves use of permits without which no manufacturer of, or dealer in, construction equipment can sell new machine to any customer.

Road Materials, Bituminous. Cheap Forms of Road Surfacing Materials, W. J. Hadfield.

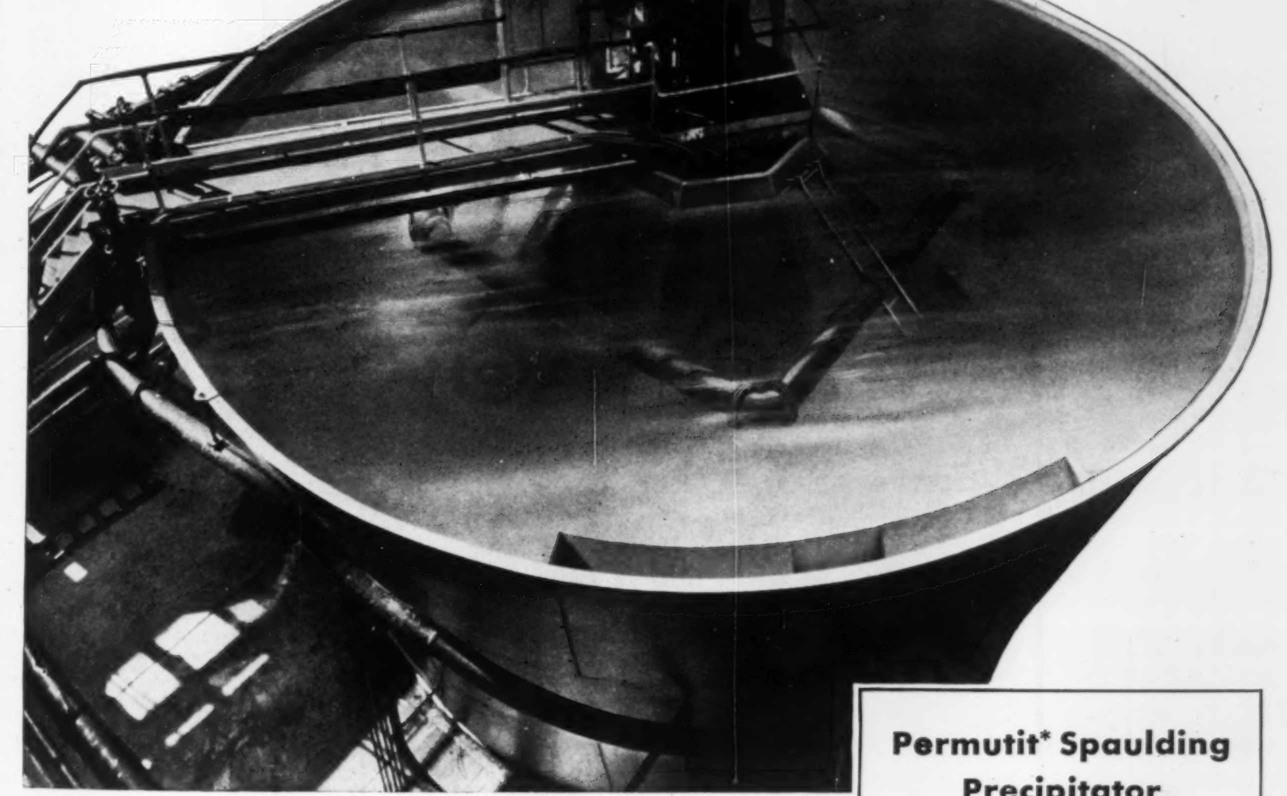
A BRIGHTER FUTURE FOR YOUR CITY

–in soft, clear, iron-free water

HAPPIER HOMES!
Soft, clear water means less work, more fun

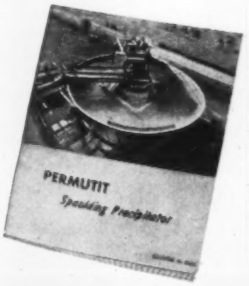
BUSIER INDUSTRIES!
Less treatment for boiler and process water

MORE PROSPEROUS SHOPS!
Better service—at less cost—for laundries, restaurants, etc.



Permutit* Spaulding Precipitator

Here's a new type of equipment that puts soft water within reach of every community. It makes cold lime soda treatment more practical than ever before, because it takes only half the space of old-type plants, cuts precipitation time, makes big savings in chemicals.



Plan now for better water

After the war, when public improvements are resumed, a good water supply will be the first thought of many communities. Take the first step toward this modern necessity *now*. Write for free booklet to The Permutit Company, Dept. A14, 330 West 42nd Street, New York, N. Y. In Canada: Permutit Company of Canada, Ltd. . . Montreal . . Toronto . . Winnipeg . . Calgary.

*Trademark Reg. U. S. Pat. Off.

PERMUTIT

WATER CONDITIONING HEADQUARTERS

LIGHTNING IS A TYPE OF AIR RAID

—BUT YOU CAN EASILY PROTECT VITAL WAR PRODUCTION!

★ An important consideration today is adequate protection of vital war production against hazards of accident and sabotage. The air raids Nature makes with lightning—which can act like either an incendiary bomb or a demolition bomb—can easily be prevented from causing disastrous loss and delay.

West Dodd Lightning Protection and static control equipment is being widely used on Army Ordnance Plants for that reason. It is helping safeguard ammunition loading lines, standard magazines, underground magazines, and bag loading buildings. Many important industrial plants have equipped their power stacks with West Dodd protection.

WEST DODD PLUS FACTORS

The 12 old line manufacturers, including the famous Dodd & Struthers Company, pioneers of modern approved lightning protection, are consolidated in West Dodd. This wealth of experience in building and installing lightning protection, and a long proved record of responsibility, are two plus factors in choosing West Dodd for the job.

The West Dodd end aerial, complete. In center is the exclusive West Dodd cable and point connector. It eliminates sharp bends formerly necessary to bond aerial and conductor. Quicker to install. Eliminates a number of connectors. Simplicity adds to efficiency and longer life.

This is one of many West Dodd items developed to meet U. S. Government requirements, cut installation time, and save labor costs while aiming at more lasting, thorough protection.

TELEPHONE OR TELEGRAPH TODAY!

WEST DODD

LIGHTNING CONDUCTOR CORP.
GOSHEN, INDIANA

Instn. Mun. & County Engrs.—J., vol. 68, no. 11, Apr. 28, 1942, pp. 341–347, (discussion) 347–350. Paper is summary of cheap surfacing work done during first years of war, most of which is based on old methods, some of which are undergoing evolution; no detailed specifications are included, but references are made to source that contains them.

ROAD MATERIALS, BITUMINOUS. Tar vs. Bitumen for Roads, E. J. Hamlin. *S. African Eng.*, vol. 53, no. 2, Feb. 1942, pp. 30, 41, and 44. Preliminary investigation showed that failure of road tars in South Africa was due mainly to three factors, which are discussed: Preparation of road tar from inferior material, specifications unsuitable for South African conditions, and ignorance of difference in properties of tar and bitumen; requirements for satisfactory specifications. From Paper before Instn. Mun. & County Engrs.

STABILIZATION. Studies of Soil-Aggregate Base Course Mixtures, J. B. Garneau and C. E. Beland. *Eng. & Contract. Rec.*, vol. 55, no. 16, Apr. 22, 1942, pp. 20–22 and 28–31; see also *Roads & Bridges*, vol. 80, no. 5, May 1942, pp. 28–29, 75, and 80–83. Report on results of investigation to determine by means of compression and capillary water absorption tests effects of variable gradation, moisture content, and admixtures upon strength and stability of soil aggregate base course mixtures.

SANITARY ENGINEERING

MOSQUITO CONTROL. Relacion de Algunos Trabajos Efectuados Aprovechando los Recursos Naturales para la Ejecucion de Obras Antimalaricas, R. Medellin. *Ingenieria* (Mexico), vol. 15, no. 12, Dec. 1941, pp. 375–376. Account of some work done, taking advantage of natural resources for undertaking malaria control works; various examples are cited, such as building, on Island of Trinidad, canals lined with cocoanut fiber sacking, to prevent stagnation of water in swamps; in each case, object was to eliminate or diminish propagation of anopheles mosquito.

SEWERAGE AND SEWAGE DISPOSAL

AERATION. Experimental Work to Improve Performance of Bio-Aeration Plant, J. Hirst. *Surveyor*, vol. 101, no. 2623, May 1, 1942, pp. 147–148. Sewage plant at Chesterfield, England, consists of detritus tanks, fine screens, and primary sedimentation tanks, having capacity of 8-hour dry weather flow; inability to maintain effluent of required standard demands improvement; report on experiments to (1) increase degree of aeration or (2) decrease strength of feed liquor. Before North East Branch Inst. Sewage Purification.

CHLORINATION. Disinfection of Sewage by Chlorination, G. E. Symons and R. W. Simpson. *Sewage Works J.*, vol. 13, no. 6, Nov. 1941, pp. 1149–1163. Paper presents summary of results of plant operating data covering 11,000 bacteriological analyses during period of thirty-one months, at Buffalo, N.Y.

COAGULATION. Chemical Coagulation of Sewage, H. W. Gehm. *Sewage Works J.*, vol. 13, no. 6, Nov. 1941, pp. 1110–1130. Discussion of proteins as aid to chemical treatment; data on dosage of gelatin necessary to improve coagulation; characteristics formed by combination of various ferric chloride ratios; effect of pH on clarification with ferrigel; proteins in as low a concentration as 4 ppm were found to reduce amount of coagulant necessary for sewage clarification from 25 to 50%.

DISPOSAL PLANTS, AIR RAID PRECAUTIONS. Defense Measures for Sewage Works, S. G. Hess. *Water Works & Sewerage*, vol. 89, no. 5, May 1942, pp. 220–221. Although actual bombardment of plant is rather remote, sabotage is factor to be considered seriously; author lists possible means of plant protection, suggests replacement parts to be held in readiness, and organization necessary in case of air-raid damage.

DISPOSAL PLANTS, ARLINGTON, VA. Unique Sewage Plant for War Office Building. *Eng. News-Rec.*, vol. 128, no. 23, June 4, 1942, p. 925. Treatment plant design to handle 9-hour flow from new War Department Office Building and adjacent military reservation in Arlington, Va.; high rate filters provide complete treatment; design data on units given.

DISPOSAL PLANTS, GARY, IND. First Year of Operation of Gary, Indiana, Sewage Treatment Plant, W. W. Mathews. *Sewage Works J.*, vol. 14, no. 2, Mar. 1942, pp. 302–312. Brief commentary on screenings, sewage pumping, grit removal, primary clarification, digesters and gas production, aeration, final settling tanks, gas engine operation, industrial wastes, administration, and operating personnel.

GAS RECOVERY. Utilization of Sludge Gas in Moderate Sized Treatment Plants, G. Martin. *Sewage Works J.*, vol. 14, no. 2, Mar. 1942, pp. 265–273, (discussion) 273–274. Brief description of 4.5-mgd primary treatment, separate sludge-digestion plant installed in sewage treatment works, Green Bay, Wis., which contains 18-mgd pumping station, bar screen, detritor, two 50-ft center-feed clarifiers, two 40-ft stationary covered digesters, two sludge gas engines and generators, 50-ft spherical gas holder, and two glass-covered and four open sludge beds.

LOOK THRU PENCIL-TEX

AND SEE WHY

Pencil-TEX
Pencil Drafting Medium
POST

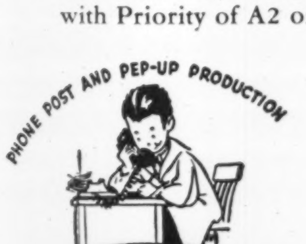
PENCIL LINES PRINT STRONG AND SHARP

You'll be able to see—and appreciate—the unbroken density of your hard pencil line. The new surface "takes" the hard pencil so completely black that light "sparkles" do not get thru the line to mar the print. That means *clean* blue-prints... blue-prints with razor-sharp definition from pencil drawings. This ocular proof of *Pencil*-TEX superiority explains why progressive draftsmen are using *Pencil*-TEX, by preference, for better results with pencil speed. And the price of *Pencil*-TEX is so "right", compared to increased speed, increased production capacity and increased satisfaction, it writes itself off in what you gain. Try *Pencil*-TEX! Take advantage of our free offer. And remember, *Pencil*-TEX is available for immediate delivery, with Priority of A2 or better, in 20 yard rolls of 30, 36 and 42 in. widths.

GET YOUR FREE TRIAL NOW

At our expense, prove to yourself the superiority of *Pencil*-TEX. Free trial samples—actual work size sheets—are yours for the asking. At the right is the name of your Post man. 'Phone him for your free trial supply, or send direct to

THE FREDERICK POST CO., BOX 803, CHICAGO


PHONE POST AND PEP-UP PRODUCTION

POST

INSTRUMENTS • EQUIPMENT • BLUE PRINT PAPERS • KINDRED SENSITIZED PRODUCTS

POST

NATIONWIDE NETWORK OF POST DEALERS

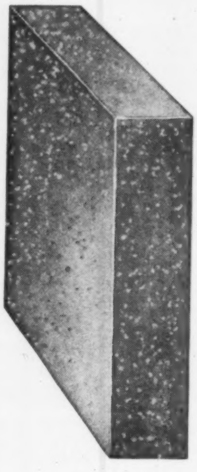
Atlanta—Georgia Blue Print Co.
Birmingham—James A. Head, Inc.
Boston—Boston Blue Print Co.
Buffalo—Buffalo Blue Print Co.
Chicago—Frederick Post Co.
Cincinnati—Queen City Blue Print Co.
Cleveland—The City Blue Printing Co.
Columbus—Franklin Blue Print & Supply Co.
Dallas—The Rush Co.
Dayton—Gem City Blue Print & Supply Co.
Denver—W. H. Kistler Stationery Co.
Detroit—Frederick Post Co.
Fort Wayne—Fort Wayne Blue Print & Supply Co.
Fort Worth—Majestic Reproduction Co.
Houston—Texas Br. Frederick Post Co.
Indianapolis—Indianapolis Blue Print & Litho Co.
Jacksonville—A. R. Cogswell
Kansas City—Western Blue Print Co.
Knoxville—Sehorn & Kennedy
Los Angeles—Stationers' Corporation
Memphis—Wray Williams Blue Print Co.
Milwaukee—Frederick Post Co. of Wis.
New Orleans—Southern Blue Print Co.
New York—John R. Cassell Co.
Oklahoma City—The A & E Equipment Co.
Omaha—Standard Blue Print Co.
Philadelphia—Philadelphia Blue Print Co.
Pittsburgh—American Blue Printing Co.
Portland—J. K. Gill Co.
St. Louis—Service Blue Print & Photo Copy Co.
Salt Lake City—Salt Lake Blue Print & Supply Co.
Seattle—Kuker-Ranken, Inc.
Tampa—Office Equipment Company
Toledo—Toledo Blue Print & Paper Co.
Tulsa—Triangle Blue Print & Supply Co.
Washington, D. C.—R. E. MacMichael
Wichita—City Blue Print Co.

JUST PHONE OR WRITE YOUR NEAREST POST MAN

★ SERVICISED
EXPANSION JOINTS

GUARD AGAINST OPEN CREVICES DURING PERIOD OF CONCRETE SLAB CONTRACTION

SERVICISED Premoulded Cork Expansion Joint is excellent for extrusion control and outstanding for recovery qualities. The minimum recovery of this expansion joint is 90% after being compressed to 50% of the original thickness. This product is ideal for construction work that requires a resilient, non-oozing type of expansion joint. Servicised Cork Expansion Joint is widely used in the construction of Dams, Highways, Bridges, Airports, Tunnels, etc.



Premoulded Cork Expansion Joint

Other premoulded expansion joints available are: Asphalt Joint, Fiber Joint and Self-Expansion Cork Joint.

These products are specified for general construction by leading Architects and Engineers throughout the country.

Servicised Expansion Joints are manufactured to comply with all Federal, State and Railroad Engineers Specifications.

(Pioneers in the manufacture of expansion joints for over twenty-two years.)

ENGINEERS:
Send for FREE CATALOG describing our complete line of Approved Construction Materials.

SERVICISED QUALITY PRODUCTS © 1930

SERVICISED PRODUCTS CORP.
6051 West 65th Street, Chicago, Ill.

PLANTS, GRIT CHAMBERS. Grit Chamber Design, T. R. Camp. *Sewage Works J.*, vol. 14, no. 2, Mar. 1942, pp. 368–381. American type grit chamber has twofold function, to remove grit from sewage, and to separate grit from putrescibles so that it may be disposed of without nuisance; there are two processes at work, settling of both grit and organics which is "differential" only in sense that grit settles faster than most of organic particles, and "scour" or "bed-load movement" of settled solids which is more effective in separating organics than settling; paper describes methods of design to take full advantage of both processes.

INDUSTRIAL WASTE. Combined Complete Treatment of Medium and High Concentration Wastes by Parallel Interacting Dissimilar Processes, E. B. Mallory. *Water Works & Sewerage*, vol. 89, no. 4, Apr. 1942, pp. 143–155. Description of design and operation of waste treatment plant utilizing "Regenerative Digestion Process" for treatment of high concentration wastes and by-product oxidized sludges; also complete secondary treatment of medium concentration wastes and tank effluents by oxidized sludge process.

INDUSTRIAL WASTE. Investigations on Treatment and Disposal of Acid Industrial Wastes, L. S. Morgan. *Sewage Works J.*, vol. 14, no. 2, Mar. 1942, pp. 404–409. Discussion limited to major acid industrial waste problems encountered in southwestern Pennsylvania, general method of disposal of such wastes by dilution into waters of state, and effects of such methods of disposal and need for proper control.

MILITARY CAMPS. Sewage Disposal Problems at Army Camps, P. Hanson and K. V. Hill. *Sewage Works J.*, vol. 14, no. 2, Mar. 1942, pp. 294–301. Sewage treatment plants for army camps; security to public health; prevention of serious nuisance; devices and loadings; attitude of state departments of health; economy; speed in design and construction of army camps; operation of sewage treatment works at army cantonments.

NEW YORK CITY. New Developments in Sewage Disposal in New York City, R. H. Gould. *Sewage Works J.*, vol. 14, no. 2, Mar. 1942, pp. 313–316. Photographs presented as visual exhibit of new developments in New York City's sewage disposal program, supplementing descriptive article previously indexed from issue of January 1942.

RESEARCH. Critical Review of Literature of 1941 on Sewage and Waste Treatment and Stream Pollution. *Sewage Works J.*, vol. 14, no. 2, Mar. 1942, pp. 317–367. Biology and chemistry; laboratory methods and analytical procedures; sedimentation; chemical treatment and flocculation; trickling and effluent filters; activated sludge; chlorination; sludge digestion and disposal; new developments and aids to practice; stream pollution; industrial wastes and their effect on sewage treatment. $7^1/_2$-page Bibliography.

SEWAGE FILTERS. New Conception of Percolating Filters in Sewage Purification, R. W. Covill. *Surveyor*, vol. 101, no. 2625, May 15, 1942, pp. 165–166. Presentation of data, mostly from American sources, which show that high-capacity filtration is more advantageous than present trickling-filter treatment; differences of operation with various high-capacity filters.

SEWERS, RECONSTRUCTION. Reconstruction of Sewer Under Railway Lines, A. W. Davey. *Surveyor*, vol. 101, no. 2622, Apr. 24, 1942, p. 139. Details of work on egg-shaped sewer, 4 ft 6 in. by 3 ft under railway lines which serve main-line terminus in borough of St. Pancras. Before Instn. Municipal and County Engrs.

SEWERS, STORM. Small Storm Overflows on Steep Gradients, F. H. Clark. *Surveyor*, vol. 101, no. 2620, Apr. 10, 1942, pp. 123–124. Illustrated description of construction of storm overflow of leap weir type designed to deal with flows from sewers on steep gradients.

SLUDGE. Experience with Sludge, Elutriation at Metropolitan District Sewage Treatment Plant, Hartford, Conn, G. H. Craemer. *Sewage Works J.*, vol. 14, no. 3, May 1942, pp. 621–628. Plant treats all sewage, with small amounts of industrial wastes, of city of Hartford and town of West Hartford and serves Blue Hills district of Bloomfield and north central (Folly Brook Valley) portion of Wethersfield; present population served by plant is 200,000; plant designed for population increase of 50%; hydraulics of plant will permit passage of total flow of 85 mgd.; flow diagram given.

SLUDGE DIGESTION. Separate Sludge Digestion Problems, W. Kunsch. *Sewage Works J.*, vol. 14, no. 3, May 1942, pp. 629–637. Paper concerned strictly with problems of sludge digestion in Danbury, Conn., and their solution; general information; Dorr digester construction and problems; new digester construction and problems; pump house layout; sludge bed layout changes; gas control and piping system; heating system layout and problems.

WARTIME. Operation of Sewerage Systems and Sewage Treatment Works from Standpoint of National Defense, W. J. Scott. *Sewage Works J.*, vol. 13, no. 6, Nov. 1941, pp. 1131–1146, (discussion) 1146–1148. Discussion of possible adverse effect of new or increased discharge of sewage or industrial wastes; review of damages that may be brought about by sabotage or enemy attack and precautions to be taken to meet such emergencies; article is complete in scope and covers all plant departments that may be adversely affected.

STRUCTURAL ENGINEERING

JOINTS, WOODEN. Timber Connectors Feature Truss Fabrication for Lumber Plant Expansion, E. Fenton. *Construction Methods*, vol. 24, no. 5, May 1942, pp. 60–61 and 112. Application of Teco timber-connector system in buildings constructed for Red River Lumber Company, Westwood, Calif.; illustrations and construction details on 100 × 338-ft loading dock extension and 84 × 800-ft shed; features of wall post trusses and post assembly.

SHIPBUILDING, WELDING. Residual Stresses in Welded Ships, H. Pierce. *Pac. Mar. Rev.*, vol. 39, no. 5, May 1942, pp. 56–58. Effect of welding on shipyard plant; peculiar problems presented by wide adoption of welding considered in detail; thermal stresses; dangerous stress examples.

STRESSES, RAILROAD BRIDGE. Abilities of Railway Girder Bridges, C. I. Stabler. *Instn. Engrs. India—J.*, vol. 21, no. 3, Dec. 1941, pp. 529–580. Paper describes system of recording strength of railway girder bridges, whereby effect of any particular locomotive on various members of girders can be ascertained easily and rapidly; system consists of plotting various uniformly distributed loads which will induce maximum permissible stress in each individual member of all different types of spans on railway, and comparing resulting graph with graph of equivalent uniformly distributed load for engine it is proposed to run.

TUNNELS

CONSTRUCTION, BLASTING. Finding Easy Way, C. F. Thomas, Jr. *Explosives Engr.*, vol. 20, no. 1, Jan. 1942, pp. 7–9. Description of manner in which contractor departed from standard methods to handle difficult tunnel job; specially designed, tractor-drawn drill carriage permitted single stage drilling and shooting of headings of four penstock tunnels 27 ft in diameter; sketch of drill round, with description of details of loading and firing.

CONSTRUCTION, SIGNALS AND SIGNALING. Photo-electric Block System Speeds Tunnel Trains. *Eng. News-Rec.*, vol. 128, no. 18, Apr. 30, 1942,

p. 16. Photoelectric block signal system entirely free of rail connection is being used to speed movement of construction trains in 13-mile Continental Divide Tunnel; at beginning and end of each block two photoelectric relays are mounted on walls about 30 ft. apart at height where trains interrupt beams from cells; relays control operation of red and green signal lights.

Subway Construction, Chicago. Chicago Subway Station Street Decking. *Eng. News-Rec.*, vol. 128, no. 21, May 21, 1942, pp. 854–858. Chicago subway rushed to completion to meet increased transportation demand due to war effort; recent work of building stations in open cut in Loop section where tubes were driven with shields under compressed air; details of different, but effective methods in street decking, excavation, and ground support used by four contractors.

WATER PIPE LINES

Air-Raid Precautions. Can American Water Systems Provide Adequate Civilian Defense? K. J. Carl. *Water Works & Sewerage*, vol. 89, no. 5, May 1942, pp. 194–197. Analysis of water systems with particular reference to fire service in vicinity of broken mains in event of air raid; even where mains of 6 to 8-in. size are completely ruptured in average distribution systems, pressure sufficient to operate domestic hose can be maintained.

Concrete. Concrete Pipe Line Distributes Water Under High Pressure. *Construction Methods*, vol. 24, no. 4, Apr. 1942, pp. 66 and 76. Construction of 24,000-ft water-supply pipeline to serve mass housing project to 30,000 defense workers at Linda Vista, Calif., in addition to enlarged aircraft manufacturing plants and other housing units in vicinity of naval training station; details of pipe laying and jointing given.

Concrete, Pre-Cast. Manufacture of Precast Concrete Pipes, S. M. Dore. *Civ. Eng.* (London), vol. 37, no. 429, Mar. 1942, pp. 52–54. Account of methods and equipment of Lock Joint Pipe Co., Ampere, N.J., in fabrication of pipe for pressure aqueduct for Boston, Mass.; construction of main and subsidiary plants; aggregates; mixers; testing laboratory. Before New England Water Works Assn.

Cross Connections. Cross Connections in Sewage Plants, G. E. Arnold. *Sewage Works J.*, vol. 14, no 3, May 1942, pp. 608–613. Outline of location of cross connections existing in various sewage plants; remedies suggested for their protection or elimination; proposed form to be used in examining sewage plants for cross connections is given.

WATER TREATMENT

Analysis, Corrosive Properties. Enslow Continuous Stability Indicator, R. S. Phillips. *Water Works & Sewage*, vol. 89, no. 3, Mar. 1942, pp. 99–101. Report of experiences and results of operation with indicator used to determine proper treatment to attain equilibrium point of finished water; monthly averages of operation are tabulated and contain figures on both alkalinity and pH of water at various points.

Chlorination. Future of Water Chlorination, H. A. Faber. *Water & Sewage*, vol. 80, no. 4, Apr. 1942, pp. 76, 79–80, and 113. Historical review of process dating from 1904 when sodium hypochlorite was first used in water supply; first chlorinator produced in United States in 1909; chlorine dosages in present use, combined chlorine, and super-chlorination treatments.

Chlorination, Wartime. Mobile Water-Sterilising Unit. *Engineering*, vol. 153, no. 3976, Mar. 27, 1942, p. 246. Brief illustrated description of unit, developed by Wallace and Tiernan Co., London, consists of two-wheeler trailer provided with self-contained pumping set for supplying water; chlorinator is hydraulically operated and designed so that from time chlorine gas enters apparatus until it is discharged as chlorine solution, it is constantly under vacuum control.

Flocculation. Water Conditioning by Flocculation, S. L. Tolman. *Am. Water Works Assn.—J.*, vol. 34, no. 3, Mar. 1942, pp. 404–411. Recent improvements in flocculation practice presented with step-by-step account of procedure; study of hydraulic characteristics; case study offered is that of filter plant of Indianapolis Water Co. Bibliography.

Problems. Some Considerations in Purification of Water, N. J. Howard. *Eng. & Contract. Rec.*, vol. 55, no. 15, Apr. 15, 1942, pp. 36–37 and 40. Review of some of more important questions involved in water purification; study of source; slow sand filtration; taste, odor, and corrosion.

Taste and Odor Removal. Taste and Odor Control in Public Water Supplies, G. A. H. Burn. *Eng. & Contract. Rec.*, vol. 55, no. 15, Apr. 15, 1942, pp. 42–45. Summary of methods most generally adopted for prevention and control; factors involved; control of algae growths and chlorine dosage; aeration; ammonia-chlorine treatment; super-chlorination and de-chlorination; activated carbon treatment. Bibliography.

Water Bacteriology. Isolation of Aerobic Sporulating Lactose-Fermenting Organism from Philadelphia Drinking Water, G. M. Eisenberg. *Am. Water Works Assn.—J.*, vol. 34, no 3, Mar. 1942, pp. 365–366. Brief description of non-coliform lactose-fermenting organisms observed recently in Philadelphia drinking water supply and tentatively designated aerobacillus schuylkilliensis. Bibliography.

WATER WORKS ENGINEERING

Emergency Plan. Mutual Aid Plan as Developed for Water Supply System of Westchester County, N.Y., J. C. Harding. *Water Works & Sewerage*, vol. 89, no. 5, May 1942, pp. 190–193. Outline of cooperative plan which involves exchange of experience, assistance in care of pipe breaks, interconnection of systems of various municipalities, emergency squad cooperation, and maintenance of air-raid control facilities.

Maintenance and Repair. Maintenance of Control Equipment in Water Purification Works, A. A. Wood. *Am. Water Works Assn.—J.*, vol. 34, no. 2, Feb. 1942, pp. 237–246. It has always been desirable to keep mechanical apparatus in first-class condition, but emergency conditions have made maintenance of high level of efficiency at all times absolute necessity; notes on institution of adequate maintenance program; minimum replacement requirements; maintenance of gages and metering devices.

Philadelphia, Pa. Rehabilitation of Philadelphia Water Works, S. M. Van Loan. *Am. Water Works Assn.—J.*, vol. 34, no. 1, Jan. 1942, pp. 107–116. Construction of first water works in 1801; subsequent extensions and improvements; first water-treatment system adopted in 1901; recent rehabilitation plans, new techniques, construction activities, and recommended construction.

Toledo, Ohio. New Lake Erie Water Supply System of Toledo, R. F. Hawkins. *Water Works & Sewerage*, vol. 89, no. 4, Apr. 1942, pp. 165–168. Particulars of supply system to serve ultimate population of 750,000; new works include intake crib and conduit, low-service pumping station, Lake Erie supply line, filter plant, 35-million-gal reservoir, high service pumping plant water tank, and trunk main.

Water Wells, Strainers. Sand Removal from Well Water, G. L. Fugate. *Water Works & Sewerage*, vol. 89, no. 4, Apr. 1942, pp. 161–164. Notes on use of Brassert automatic self-cleaning strainers at Houston, Tex.; Brassert strainer consists essentially of rotating cone-shaped drum, fixed to vertical shaft centered within cast-iron housing.

BROTHER THIS IS WAR!

Wartime is no time to gamble
...even on tracing cloth quality

Prudence
TRACING CLOTH
Arkwright
PENCIL CLOTH
WHITE
Arkwright
PENCIL TRACING CLOTH
Matsurf
PENCIL TRACING CLOTH
Arkwright
TRACING CLOTH

On any job it's bad to be asking, "Is that a 3 or an 8?" On a war job it's inexcusable. The men who work with your blueprints are not "mind readers". Use Arkwright for your transfers – get clear, sharp prints every time – on tracing cloth that will last for years! This strong, uniform, superbly woven tracing cloth is *built* for today's speedy production. Run it through the machine time after time – no curling, fraying, tearing! Next time, specify Arkwright! Arkwright Finishing Company, Providence, R. I.

Arkwright TRACING CLOTHS

AMERICA'S STANDARD FOR OVER 20 YEARS

"Saluting"---

THE FLYING FORTRESS
—BOEING'S FAMED B-17-E

Out-flying, out-fighting and out-bombing anything it meets in the air—on any front, the Flying Fortress has a reputation of proven superiority. It is a masterpiece of skillful engineering born of wide research and countless experiments. To such war equipment Americans pay thankful and admiring tribute.

But for men who build such planes, those who train to fly them—and for millions of people at home, there must be an abundance of water. To a water system the name Layne is as famed as that of Boeing to long range bombers. Layne has built thousands of water systems—the very biggest in the United States. Layne likewise builds pumps—the kind that out-pump, out-last and out-perform any deep well water producing equipment in any territory—on any task.

Layne's reputation, like that of the Flying Fortress has been proven the hard way—on the field of action. Layne Wells and Pumps by the hundreds are producing millions and millions of gallons of water for manufacturers, cities, railroads and the army and navy. For late catalogs, bulletins and detail information, address

LAYNE & BOWLER, INC.
Memphis, Tenn.

LAYNE
PUMPS & WELL
WATER SYSTEMS

Affiliated Companies

Layne-Arkansas Company............Stuttgart, Ark.
Layne-Atlantic Company..................Norfolk, Va.
Layne-Bowler New England Corp...Boston, Mass.
Layne-Central Company.............Memphis, Tenn.
Layne-Northern Company..........Mishawaka, Ind.
Layne-Louisiana Company......Lake Charles, La.
Louisiana Well Company...............Monroe, La.
Layne-New York Company..........New York City
Layne-Northwest Company......Milwaukee, Wis.
Layne-Ohio Company..................Columbus, Ohio
Layne-Texas Company..............Houston, Texas.
Layne-Western Company..........Kansas City, Mo.
Layne-Western Co. of Minn.....Minneapolis, Minn.
International Water Supply, Ltd...London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

Equipment, Materials, and Methods

New Developments of Interest, as Reported by Manufacturers

Strength Research on Armco Emergency Wood Pipe

FIELD AND laboratory tests on Emergency Wood Pipe show it possesses ample strength. Unique shape and joints cause pipe to react much the same as flexible corrugated metal pipe.

The purpose of the investigation was to determine the structural behavior of a new type of wood pipe and the "pipe-arch" developed by that Association as a substitute for metal pipe during the period of steel conservation. The new pipe, known as Armco Emergency Wood Pipe, consists of a series of interconnected polygonal shaped rings, each side of which is a prefabricated segment, the ends of which are mortised and doweled together so as to form a semi-flexible hinged corner.

Three types of tests were made: laboratory, live load, and dead load. For the *laboratory* tests, twenty specimens ranging from 24 to 72 in. in diameter were tested in two-point bearing. The *live load* consisted of a truck loaded to give an axle load increasing from 11,420 lb to 28,160 lb, or 50 per cent more than the legal limits of most states. The fill over the wooden structures varied from 0.9 ft to 4.2 ft. The *dead load* test was made by piling steel ingots on a 48-inch octagonal shaped pipe under 4 ft of cover. This test was carried to failure which occurred at 130 tons, or the equivalent of 40 ft of earth cover.

The results of these extensive field and laboratory tests on twenty different sizes and shapes of wood pipes and conduits have been published in a 43-page illustrated report issued in a limited edition by the Armco Drainage Products Association, Middletown, Ohio.

Emergency Formulas for Wood Preservatives

IN ORDER TO CONSERVE chromium, copper, and phenol compounds for vital war uses, Emergency Federal Specifications for wood-preservatives have been issued by the U.S. Forest Products Laboratory and the Federal Specifications Committee at the instance of the War Production Board. These are offered as war-time substitutes, to be used where they will serve as suitable alternates to the standard chrome-bearing compositions, for preservative treatment of lumber for military, war-plant, and shipbuilding needs.

The withdrawal of chromates, phenolics, and copper compounds will mean some lowering of wood-preserving standards, according to Mr. J. F. Linthicum, president of the American Lumber and Treating Company, although he calls the "emergency specifications" adequate for many wartime structural needs. The specifications offer two formulas. One is a 50-50 mixture of borax and boric acid; the other contains equal parts of sodium fluoride, sodium arsenate, borax and boric acid (very similar to Wolman Salts except that the borax and boric acid replace chromate and dinitrophenol). Both Wolman Salts preservative and chromated zinc chloride—the two preservative compositions in widest use—will be affected. No substitute for coal tar creosote is specified. However, provision has been made to relax Federal requirements for creosote purity during the emergency.

Barricade Block

TO TAKE THE PLACE OF COSTLY, SHORT-LIVED sandbag barricades for sabotage protection around power transformers, substations and other vulnerable public utility and industrial equipment, The Celotex Corporation, 919 N. Michigan Ave., Chicago, Ill., has devised an economical wall of lightweight concrete blocks filled with sand. Tests have demonstrated that a wall of 12 in. hollow blocks filled with sand will stop high-powered .30 calibre rifle and machine gun fire at distances as short as 10 ft.

The concrete block wall, according to reports, has several advantages over the traditional sandbag barricade. It costs from one-half to two-thirds less and its life is many times longer; such blocks are readily available in all parts of the country, whereas sandbag cloth is now on the critical materials list.

New Hydraulic Jack

THE BEE LINE CO., Davenport, Iowa, announces a new 50-ton hydraulic jack. The unit is recommended particularly for work requiring a compact jack of light and sturdy construction.

Some of the salient features claimed for the new product are: large oil ports and passages assuring quick return of ram and no air-bound troubles; simple construction, fewer parts; large pressure areas requiring less oil pressure per ton of lifting capacity; automatic take-up on all packing, nothing to adjust or tighten in service; fifty per cent overload guarantee; total weight 74 lb. For further information, write to the manufacturer.

Lincoln Welding Handbook Ties In with War Effort

"Procedure Handbook of Arc Welding Design and Practice," seventh edition, published by The Lincoln Electric Company, Cleveland, Ohio; 1,308 pages, 6 × 9 in., 1,810 illustrations, including photographs and drawings; cover, semi-flexible simulated leather, gold embossed; price postpaid United States, $1.50 a copy, elsewhere, $2.00 a copy.

Greatly enlarged, the seventh edition of the Procedure Handbook, just published, takes on a new signficance this year. Authors of the book have made every effort to provide as much complete and up-to-date information as possible on the various methods and techniques used in welding. The exhaustively illustrated chapter on "Typical Applications of Arc Welding" carries many new applications, developed during the past year, in the many fields of war production. Timely information is given on such subjects as welding symbols, new allowable stresses, pre-heating for welding, stress relieving, procedures, speeds and costs, "Fleet-Filler" technique, general metallurgical characteristics of metals and alloys, weldability of aluminum alloys, tubular construction, appearance and styling of welded design.

The eight sections of the Procedure Handbook cover the following subjects: Part I—Welding Methods and Equipment (28 pages); Part II—Technique of Welding (116 pages); Part III—Procedures, Speeds and Costs (119 pages) and Part III Supplement; Part IV—Weld Metal and Methods of Testing (30 pages); Part V—Weldability of Metals (98 pages); Part VI—Welded Steel Construction—Machine Design (204 pages); Part VII—Designing of Arc Welded Structures (274 pages); Part VIII—Typical Applications of Arc Welding in Manufacturing, Construction and Maintenance (439 pages).

A review of this book cannot adequately describe the wealth of material it contains. Those who have seen the past editions realize that it is a "must" in the library of every consultant, designer, and contractor concerned with welded construction.

Heavy-Duty Jack

Templeton, Kenly & Co., Chicago, announce the addition of a 25-ton standard speed, bevel gear, ball-bearing screw jack, No. 7300, to their Simplex line.

Designed for heavy duty lifting, lowering, and skidding work, this jack is said by the manufacturer to be ideal for all heavy industrial work because of its safe mechanical action, screw adjustment and enclosed ratchet mechanism combined with both toe and cap lift. Toe lift is a minimum of 11 in. from base, but jacks can be made with toe in any position to suit user's requirements, and the base design can be modified. No. 7300 is guaranteed to lift its full rated capacity of 25 tons on cap and $12^1/_2$ tons on toe; has a full 6 in. lift and weighs only 82 lbs complete.

LET CELOTEX BUILDING PRODUCTS
Take You Off the Spot

NEW PARTITIONS AND IN A HURRY!
WANTED: A GOOD BUILT-UP ROOF FOR NEW ADDITION–QUICK!
MATERIAL FOR EXTERIOR WALLS–...NOW!
SHOCK-ABSORBING FLOOR... FAST!
SOUND-QUIETING MATERIALS FOR OFFICE AND FACTORY ..IMMEDIATELY!

Non-Critical Celotex Products
Will Help You Meet Emergency Demands

ARE *you* on the spot? Do *you* have to have materials for partitions—quick—insulated exterior wall panels right now—hurry-up housing for workers? Then get all the facts about new, non-critical Celotex Products now being produced to replace "frozen" materials!

Celotex Building Products are available right now to take care of a wide range of emergency requirements. Shock-absorbing factory floors—built-up roofs and efficient roof insulation—sound conditioning for quiet in office and plant—these are other needs Celotex can help you solve!

Countless government projects are moving forward without delay, because of the ready availability of dependable materials provided by many Celotex plants. Write for your copy of our new Industrial Catalog No. 10—and see how many of *your* needs are met by Celotex Products!

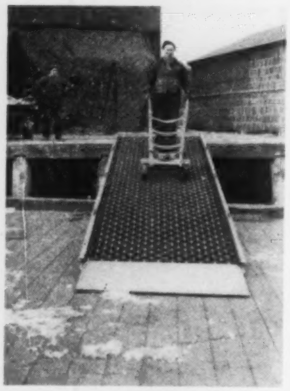
CELOTEX
REG. U. S. PAT. OFF.
BUILDING PRODUCTS

The word Celotex is a brand name identifying a group of products marketed by The Celotex Corporation.

THE CELOTEX CORPORATION • CHICAGO

IRVING "SUBWAY" GRATING

"GANGWAY!"



Few places are busier than the Gangways used for transferring war material from docks to ships.

It is important that Gangways be safe and able to stand the gaff.

Gangways of Irving "SUBWAY" Grating are Safe and Comfortable for Working, Walking and Wheeling and the Most Durable type available.

Let's quote on your requirements.

IRVING SUBWAY GRATING CO., INC.
5008 27th Street
LONG ISLAND CITY, NEW YORK

Polaroid*...
Photoelastic Polariscope
for Stress Determination

To the machine designer, photoelastic stress analysis is not only of value in the verification of calculations based on theoretical solutions, but also in the solution of problems where theoretical analysis is not available. Where weight and space must be conserved actual stress distribution is more important than stress indicated by theoretical analysis.

In the new model polariscopes of 4¼" and 6¼" clear aperture, the parallel beam is collected by a rear element and condensed through a three component lens of the Cooke system. In the new larger units (8¾" and 10" aperture) a four component lens of the Omnar system is used. In both cases, *the image is sharp throughout the field, free of aberration, astigmatism and distortion.*

Literature of new model polariscope now available

POLARIZING INSTRUMENT CO.
630 Fifth Ave., New York, N. Y.

**T. M. Reg. U. S. Pat. Off. by Polaroid Corporation*

Wide Gauge Mobilcrane

THE EXTRA WIDTH of the chassis of the Model 805WM Mobilcrane, and the use of 18 wheels (12 rear, 6 front) make it possible to lift loads up to 30 tons over the side of the machine without the use of outriggers, and to carry the load to the desired location. This adds greatly increased stability to these wheel mounted cranes. All operating functions of the machine are controlled by air power. Independent travel, independent boom hoist, extra wide chassis, hydraulic steering, and air brakes are other advanced features that give the 805WM Mobilcrane the ability to get the job done quickly, efficiently, and economically.

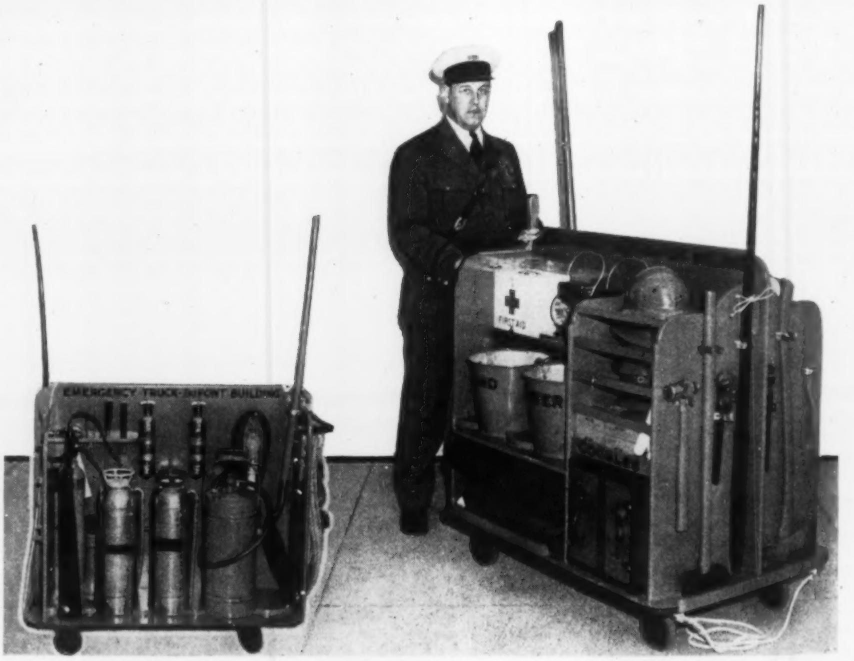
The tandem rear wheel drive unit, which consists of a chain case and cover carrying 6 wheels, 3 forward and 3 back, with 4 on the outside of the chassis, and 2 inside, oscillates up and down to absorb shock and keep the machine level when traveling over rough or uneven ground. The front axle carries 3 wheels on each side, with the axle suspended in a saddle block, which allows it to oscillate vertically. Leveling jacks on either side of the frame over the axle may be applied to keep the machine on an even keel when operating.

The boom is available with variable length inserts, and is equipped with a telescopic backstop, which allows the boom to be lowered to the ground, and to be raised to its minimum safe working angle. The independent boom hoist is mounted in the upper part of the gantry, and is operated by two large Twin Disc clutches. A self-locking worm and worm wheel, for maximum safety, is driven by a pair of bevel gears. A safety brake is also provided to prevent the boom from running down under heavy loads.

The Model 805WM Mobilcrane is also available with a standard width chassis, and 12 wheels, for use in narrow or confined quarters. Stability is obtained through the use of jack arms, which fold up out of the way when not in use.

"Fire Buggy"

A SPECIALLY DESIGNED hand truck compactly laden with 50-odd tools has been developed by Du Pont technicians for use in its Wilmington office buildings in the event of emergency.



Combining the best features of various types of mobile emergency trucks with a number of original improvements, the 4-ft long red "buggy" in the opinion of its designers is the most completely equipped vehicle of its kind. Mounted on wheels and easily moved by one man, the truck will roll into service under a crew of seven men trained by the buildings' fire marshal. It carries an assortment of tools ranging from five types of fire extinguishers to a jack capable of lifting three tons. Among details of design it is noted that all corners of the truck are rounded and most of the equipment may be instantaneously removed by pulling forward from clips rather than being lifted up out of slots.

Included in the paraphernalia on both ends of the truck and along the sides of a central panel are: crow bar, sledge, goggles, shovel, electric lanterns, asbestos gloves, safety helmets, first aid kit, rope, bolt cutters, tarpaulin, as well as 40 other pieces of emergency equipment.

Plans to enable industrial firms, institutions, office buildings, and other interested organizations to construct and equip an identical emergency truck will be supplied on request to the Office Buildings Div., E. I. Du Pont de Nemours & Co., Wilmington, Del.

Literature Available

Aggregate Bases—A new book, "Better Bases for Better Surfaces," on the design and construction of bases for highways and airport runway pavements, is announced by the Solvay Sales Corporation, 40 Rector St., New York, N.Y. It condenses information from recent reports which show the varying amounts of compaction and density necessary to insure ultimate stability of various types of graded aggregate bases, includes information on improved methods, and specifications used in the construction of bases with various types of materials.

Blowers—Rotary positive blowers are covered by Bulletin 22:23-B-11, issued by the Roots-Connersville Blower Corp., Connersville, Ind. It comprises twenty pages, showing numerous installation views, details of construction, discussion of operating principle, accessories, and specifications.

Chemical Feeding—"Corrective Chemical Feeding," a 12-page bulletin issued by the American Water Softener Company of Philadelphia, contains photographs, helpful technical data, and a detachable "Information Sheet" to facilitate the requesting of recommendations and quotations.

Electric Motors—Allis-Chalmers Manufacturing Co., Milwaukee, Wis., announce the publication of a new kind of maintenance handbook—"A Guide to Wartime Care of Electric Motors" to fill the need caused by war-time conditions, such as increase in the average motor's working time, importance of continous motor operation, increasing difficulty of obtaining new motors, and lack of previous experience with electric motors on the part of many new workers in war production plants. It treats in turn with the various "Electric Motor Enemies," includes a "Quick Diagnosis of Motor Ailments," and is filled with idea-pictures drawn in cartoon style.

Sewage Plants—"Wrought Iron for Sewage Treatment and Disposal Installations," is the title of a 28-page technical bulletin just published by A. M. Byers Co., Pittsburgh, Pa. The booklet discusses various corrosive conditions encountered in designing sewage disposal water lines, outfall line service, drainage lines, and heating system returns. It describes properties of wrought iron and how wrought iron lends itself to corrosion control.

Welding Electrode Conservation—A new 14-page "fight waste" bulletin—"Make 3 do the work of 4"—has just been issued by Air Reduction Sales Co., 60 East 42nd St., New York, N.Y. The booklet, which consists of a series of shop posters, is designed to help arc welding operators do more useful work with every electrode. Each poster—and there are six in all—illustrates a common wasteful practice, then shows the corresponding good practice and points out the ease and simplicity of doing the job the right way. Posters are bound into the booklet—yet are perforated and can be detached and tacked on shop bulletin boards.

FOUNDATIONS

PRETEST UNDERPINNING
CONCRETE-STEEL PILES
MASS CONCRETE CONSTRUCTION
HEAVY SHORING
DRILLED-IN CAISSONS

DRILLED-IN CAISSONS
FOUNDATIONS
Spencer, White and Prentis Inc.
UNDERPINNING

Send for catalogs descriptive of the latest foundation types and methods.

SPENCER, WHITE & PRENTIS, INC.
10 EAST 40th ST. NEW YORK, N. Y.

HOW LONG SHOULD A BATH LAST?

Just long enough to set the coating— **if it's the water bath that follows the zinc dipping. (Too long in the water might cause white rust; insufficient cooling might leave enough heat to burn the coating white or cause it to peel.)**
It's just one of the many steps in galvanizing that requires a nicety of judgment gained only after long experience. And, that's the kind of experience we have—and apply to all orders, large or small.

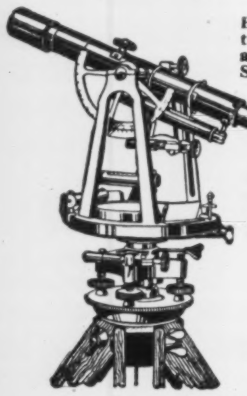
ENTERPRISE GALVANIZING COMPANY
2501 E. CUMBERLAND ST., PHILADELPHIA, PA
"To Economize—Galvanize at Enterprise!"

"COMMERCIAL" METHODS

of tunneling—described in our booklet—every engineer interested in tunnel design should have it—Drop us a card.

COMMERCIAL
TUNNEL LINERS

THE COMMERCIAL SHEARING AND STAMPING CO.
YOUNGSTOWN, OHIO



BUFF
TRADE MARK TRADE MARK

WORLD FAMOUS FOR 74 YEARS

Transits and Levels for Civil and Mining Engineers

Buff precision and design are continuously in the forefront.

ENGINEERS and contractors know that BUFF performance is accurate and sure—with adjustments that hold permanently.

THE BUFF "X" TELESCOPE

has the finest and highest definition and simplest lens system. It is useful when the light is dim.

Buff is used almost exclusively on the largest works in this country and Canada and Mexico and So. America.

Astronomical lens experts.

All makes—intelligently repaired and regraduated by Factory Experts.

The finest work at the LOWEST POSSIBLE COST. Reliability and guaranteed work. A special Souvenir Plumb Bob sent gratis to graduate Civil Engineers.

THE Greatest ACCURACY
THE Hardest BRONZE
THE Simplest DESIGN

Buff & Buff Company

Jamaica Plain, Massachusetts

ELEMENTARY STRUCTURAL ANALYSIS & DESIGN

By L. E. Grinter

Especially designed for architects, mechanical engineers, and others not specializing in bridges, this text gives a complete course in the analysis and design of simple structures of steel, timber and reinforced concrete. It emphasizes member and joint design, with treatment of both riveting and welding for steel structures. Roof truss design in both steel and timber is discussed. Concrete beams, slabs, columns and footings are treated in accord with the 1940 Joint Committee Report. 50 design sheets are included, and all standard specifications. 383 pages. $3.75

THE MACMILLAN COMPANY, 60 FIFTH AVE., NEW YORK

INDEX OF PRODUCTS

- Acetylene
  - Air Reduction Sales Co.
- Acetylene Generators
  - Air Reduction Sales Co.
- Aerial Cableways and Tramways
  - Wickwire Spencer Steel Co.
- Airport Drainage
  - Lock Joint Pipe Co.
- Aluminum, Structural
  - Aluminum Co. of America
- Anchors for Fenders and Tunnel Forms
  - Richmond Screw Anchor Co., Inc.
- Asphalt
  - Texas Co.
- Asphalt Plank Bridge and Industrial Flooring
  - Philip Carey Mfg. Co.
  - Servicised Products Corp.
- Asphalt and Rubber Compounds
  - Servicised Products Corp.
- Bars, Aluminum
  - Aluminum Co. of America
- Bars, Iron and Steel
  - Bethlehem Steel Co.
- Barges, Steel
  - American Bridge Co.
- Belting, Metal Conveyor
  - Wickwire, Spencer Steel Co.
- Bins, Storage
  - American Bridge Co.
- Blower Pipe, Steel, for Ventilation Purposes
  - Lock Joint Pipe Co.
- Blue Print Papers
  - Frederick Post Co.
- Books, Technical
  - Macmillan Co.
  - John Wiley & Sons, Inc.
- Borings, Test
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Bridges
  - American Bridge Co.
  - Bethlehem Steel Co.
- Bridge Floors, Grating
  - Irving Subway Grating Co., Inc.
- Bridge Planks, Mineral Surfaced Asphalt
  - Philip Carey Mfg. Co.
  - Johns-Manville Corp.
- Buildings, Steel
  - American Bridge Co.
  - Bethlehem Steel Co.
- Caissons
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Calcium Chloride
  - Solvay Sales Corp.
- Cement, Portland
  - Portland Cement Assn.
- Chemical Feeds
  - Permutit Co.
- Chlorine
  - Solvay Sales Co.
- Coagulation Equipment, Floc Formers, Sludge Removers, Settling Tanks
  - Permutit Co.
- Cold Mix
  - Texas Co.
- Concrete Admixtures
  - Johns-Manville Corp.
- Concrete Forms
  - Douglas Fir Plywood Assn.
- Concrete Form Anchors, Wood or Steel Forms, Light and Heavy Construction
  - Richmond Screw Anchor Co., Inc.
- Concrete Reinforcement
  - Bethlehem Steel Co.
  - Wickwire Spencer Steel Co.
- Conductors, Lightning
  - West Dodd Lightning Conductor Corp.
- Contractors
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Corrugated Sheets, Aluminum
  - Aluminum Co. of America
- Corrugated Sheets, Asbestos-Cement
  - Johns-Manville Corp.
- Culverts, Asbestos-Cement
  - Johns-Manville Corp.
- Culverts, Cast Iron
  - Cast Iron Pipe Research Assn.
- Culverts, Reinforced Concrete
  - Lock Joint Pipe Co.
- Damp-Proof Compounds
  - Philip Carey Mfg Co.
- Deaerators and Degasifiers
  - Permutit Co.
- Drafting Instruments and Materials
  - Keuffel and Esser Co.
  - Frederick Post Co.
- Drafting Materials
  - Arkwright Finishing Co.
- Drafting Room Furniture
  - Frederick Post Co.
- Drains, Reinforced Concrete
  - Lock Joint Pipe Co.
- Drawing Supplies
  - Keuffel & Esser Co.
  - Koh-I-Noor Pencil Co.
- Dust Cure
  - Texas Co.
- Engineers
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Engineering Instruments
  - Keuffel & Esser Co.
- Engineering Tapes and Scales
  - Frederick Post Co.
- Expansion Joints, Asphalt or Cork
  - Johns-Manville Corp.
- Expansion Joints, Asphalt, Cork or Rubber
  - Servicised Products Corp.
- Filler, Asphalt
  - Philip Carey Mfg. Co.
- Floor Tile, Rubber and Cork
  - Servicised Products Corp.
- Flooring, Aluminum
  - Aluminum Co. of America
- Flooring, Asphalt Tile
  - Johns-Manville Corp.
- Flooring, Grating
  - Irving Subway Grating Co., Inc.
- Flooring, Shock-Absorbing
  - Celotex Corp.
- Flux, Welding, Brazing, Etc.
  - Air Reduction Sales Co.
- Form Clamps, Concrete Wall Construction
  - Richmond Screw Anchor Co., Inc.
- Form Ties, Concrete Wall Construction
  - Richmond Screw Anchor Co., Inc.
- Foundations
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Galvanizing and Galvanized Products
  - Enterprise Galvanizing Co.
- Gas Density Indicators and Recorders
  - Permutit Co.
- Gauges, Acetylene, Oxygen
  - Air Reduction Sales Co.
- Grating, Steel Flooring
  - Irving Subway Grating Co., Inc.
- Hanging Device for Concrete Forms
  - Richmond Screw Anchor Co., Inc.
- Heavy Stampings
  - Commercial Shearing & Stamping Co.
- Inks, Waterproof, Pigment, Drawing
  - Keuffel & Esser Co.
- Instruments
  - Buff and Buff Co.
  - Keuffel & Esser Co.
  - Polarizing Instrument Co.
- Insulating Materials
  - Celotex Corp.
- Iron Removal Equipment
  - Permutit Co.
- Joints, Expansion, Paving
  - Philip Carey Mfg. Co.
- Lettering Guides
  - Keuffel & Esser Co.
- Levels
  - Buff & Buff Co.
  - Keuffel & Esser Co.
- Lightning Protection
  - West Dodd Lightning Conductor Corp.
- Liners, Tunnel
  - Commercial Shearing & Stamping Co.
- Machinery, Pipe Cutting and Bevelling
  - Air Reduction Sales Co.
- Measuring Tapes
  - Keuffel & Esser Co.

Continued on page 33

INDEX OF PRODUCTS

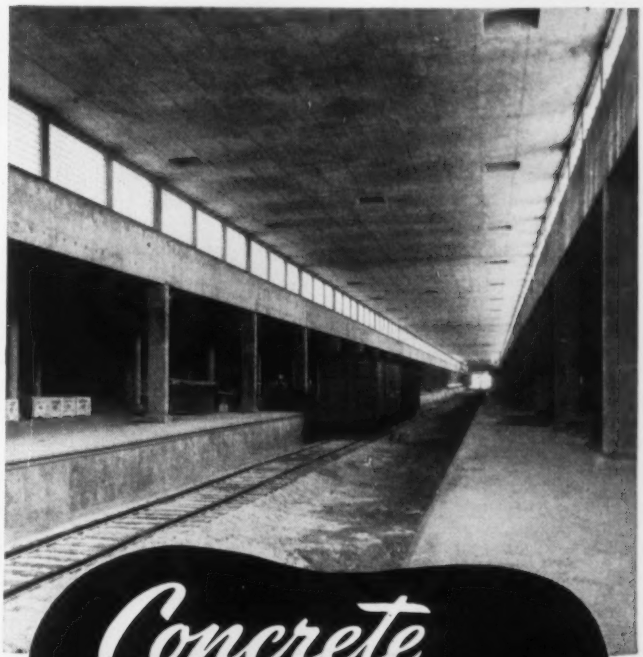
Continued from page 32

- Metal Connectors for Timber Joints
  - Timber Engineering Co.
- Metal Termite Shields
  - Timber Engineering Co.
- Nickel and Its Alloys
  - International Nickel Co., Inc.
- Oxygen
  - Air Reduction Sales Co.
- Paint, Pigment, Aluminum
  - Aluminum Co. of America
- Paper, Drawing and Tracing
  - Keuffel & Esser Co.
- Partition Materials
  - Celotex Corp.
- Paving Materials
  - Portland Cement Assn.
  - Texas Co.
- Pencils
  - Koh-I-Noor Pencil Co.
- Penstocks
  - American Bridge Co.
  - Bethlehem Steel Co.
  - Lock Joint Pipe Co.
- Perforated Metal
  - Wickwire Spencer Steel Co.
- Piles, Concrete
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
- Piles, Steel Bearing
  - Bethlehem Steel Co.
- Piles, Steel Shell
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Piling, Steel Sheet
  - Bethlehem Steel Co.
- Pipe, Asbestos-Cement
  - Johns-Manville Corp.
- Pipe, Cast Iron
  - Cast Iron Pipe Research Assn.
- Pipe, Reinforced Concrete
  - Lock Joint Pipe Co.
- Pipe Coating, Asphalt
  - Texas Co.
- Pipe Fittings, Cast Iron
  - Cast Iron Pipe Research Assn.
- Pipe Wrapping, Asbestos Felt
  - Johns-Manville Corp.
- Plastic, Asphalt
  - Philip Carey Mfg. Co.
- Plate Work
  - American Bridge Co.
- Plywood
  - Douglas Fir Plywood Assn.
- Polariscope
  - Polarizing Instrument Co.
- Portland Cement
  - Portland Cement Assn.
- Pumps
  - Layne & Bowler, Inc.
- Regulators, Oxyacetylene
  - Air Reduction Sales Co.
- Reinforcement Fabric
  - Wickwire Spencer Steel Co.
- Road Oils
  - Texas Co.
- Road Surfacing Materials
  - Texas Co.
- Rods, Wire
  - Wickwire Spencer Steel Co.
- Roofing Materials
  - Philip Carey Mfg. Co.
  - Johns-Manville Corp.
  - Servicised Products Corp.
  - Texas Co.
- Rope, Wire
  - Bethlehem Steel Co.
  - Wickwire Spencer Steel Co.
- Screens, Woven Wire
  - Wickwire Spencer Steel Co.
- Sewer Pipe, Reinforced Concrete
  - Lock Joint Pipe Co.
- Sewer Pipe Belts, Premoulded
  - Servicised Products Corp.
- Sewer Pipe Compound
  - Servicised Products Corp.
- Sheathing, Wood
  - Douglas Fir Plywood Assn.
- Sheets, Aluminum
  - Aluminum Co. of America
- Sheets, Asbestos-Cement
  - Johns-Manville Corp.
- Sheets, Iron and Steel
  - Bethlehem Steel Co.
- Shoring
  - Spencer, White & Prentis, Inc.
- Silica Removal Equipment
  - Permutit Co.
- Soda Ash
  - Solvay Sales Corp.
- Springs, Extension, Compression, Torsion or Flat
  - Wickwire Spencer Steel Co.
- Stacks
  - American Bridge Co.
  - Bethlehem Steel Co.
- Static Control Equipment
  - West Dodd Lightning Conductor Corp.
- Steel, Structural
  - Bethlehem Steel Co.
- Steel Shells
  - MacArthur Concrete Pile Corp.
- Steps, Safety Grating
  - Irving Subway Grating Co., Inc.
- Strands, Wire
  - Wickwire Spencer Steel Co.
- Subaqueous Intakes and Outfalls, Reinforced Concrete
  - Lock Joint Pipe Co.
- Surveying Instruments
  - Buff and Buff Co.
  - Keuffel & Esser Co.
- Swimming Pool Purification and Recirculation Equipment
  - Permutit Co.
- Tanks
  - American Bridge Co.
  - Bethlehem Steel Co.
- Technical Books
  - Macmillan Co.
  - John Wiley & Sons, Inc.
- Termite Shields
  - Timber Engineering Co.
- Timber Joint Connectors
  - Timber Engineering Co.
- Torches, Welding and Cutting
  - Air Reduction Sales Co.
- Towers, Steel
  - American Bridge Co.
  - Bethlehem Steel Co.
- Tracing Cloth
  - Arkwright Finishing Co.
- Tracing Duplications
  - Frederick Post Co.
- Track, Industrial and Portable
  - Bethlehem Steel Co.
- Transits
  - Buff and Buff Co.
  - Keuffel & Esser Co.
- Tunnel Liners
  - Commercial Shearing & Stamping Co.
- Turntables
  - American Bridge Co.
- Tying Devices for Concrete Forms
  - Richmond Screw Anchor Co., Inc.
- Underpinning
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Valves, Multiport, Pilot, Automatic Desludging
  - Permutit Co.
- Water Controllers and Indicators
  - Permutit Co.
- Water, Dealkalization
  - Permutit Co.
- Water, Demineralizing (Removal of Total Solids)
  - Permutit Co.
- Water Filters
  - Permutit Co.
- Water, Fluoride Removal from
  - Permutit Co.
- Water, Neutralization, Control of pH
  - Permutit Co.
- Water Softeners, Zeolite—Pressure and Gravity, Hydrogen Zeolite, Hot and Cold Lime Soda, Cold Lime (Spaulding Precipitator and Spiractor)
  - Permutit Co.
- Water Supply Equipment
  - Layne & Bowler, Inc.
- Water Supply Pipe, Reinforced Concrete
  - Lock Joint Pipe Co.
- Waterproofings, Membrane
  - Philip Carey Mfg. Co.
- Welding and Cutting Apparatus
  - Air Reduction Sales Co.
- Well Water Systems
  - Layne & Bowler, Inc.
- Wire, Flat, Round, Square
  - Wickwire Spencer Steel Co.
- Wire Cloth
  - Wickwire Spencer Steel Co.
- Wire Rope and Strands
  - Bethlehem Steel Co.
  - Wickwire Spencer Steel Co.

Alphabetical Index to Advertisers shown on page 34

The Society reserves the privilege of rejecting advertisements inconsistent with its ethical procedure

17-acre all-concrete warehouse for U. S. Army; 1400 x 540 ft. Architects: Mills, Rhines, Bellman and Nordhoff, Toledo. Engineer: R. C. Reese, Toledo. Contractors: Skilken Bros., Columbus, Ohio.



Concrete can help conserve steel and transportation

The Portland Cement Association's technical staff is available to assist war construction designers and builders to—

Get adequate designs, using a minimum of steel—often no steel;

Reduce the burden on transportation facilities.

A storehouse of data, gathered through a quarter of a century of laboratory research and field study, is ready to help solve concrete war construction problems. Recent developments in design greatly reduce or eliminate the need for steel in pavements and many structures. Improved structural designs often reduce concrete quantities without lessening strength, serviceability or hazard protection.

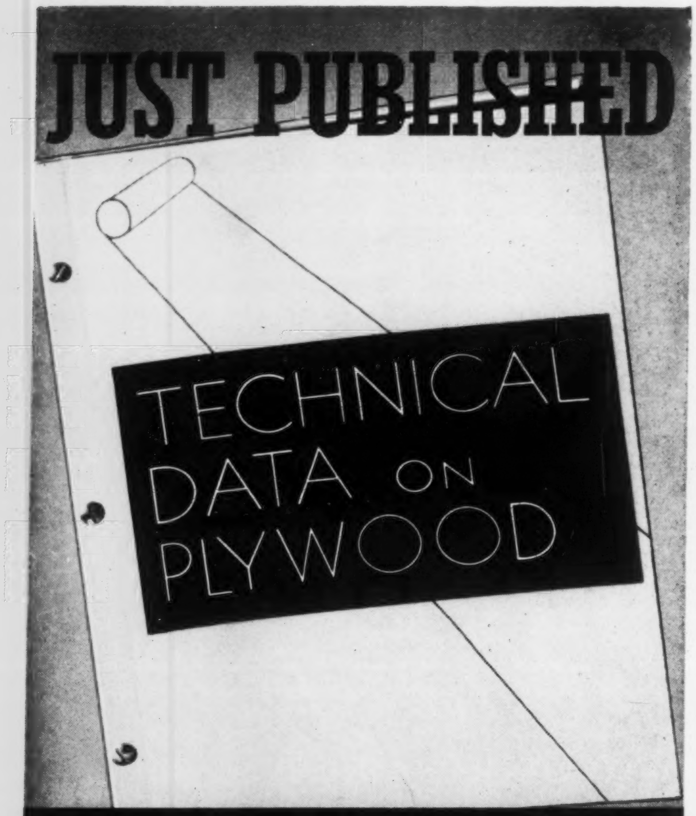
Because the bulk of concrete material is usually available locally, the burden on transportation is reduced.

Our specially trained staff of technicians is ready to aid engineers, architects and contractors to get the maximum service which concrete can render on all types of war construction.

PORTLAND CEMENT ASSOCIATION
Dept. 9-13, 33 W. Grand Ave., Chicago, Ill.

★

BUY WAR SAVINGS BONDS



. . . the first 2 chapters of a new engineering handbook on Douglas Fir Plywood

Write for your free copy of this loose-leaf data book now. Additional chapters will be sent you as they are completed!

- This engineering handbook contains data on the mechanical properties of Douglas Fir Plywood never before available to engineers and architects. You will find that this data makes Douglas Fir Plywood far more useful to you . . . that it will enable you to specify this *"miracle wood"* as a pinch hitter for unavailable materials, as a structural material and for countless other purposes.

Write now for your free copy of *"Technical Data on Plywood."* It is in loose-leaf form, and you will be sent additional chapters as they are published. Douglas Fir Plywood Association, Tacoma Bldg., Tacoma, Washington.

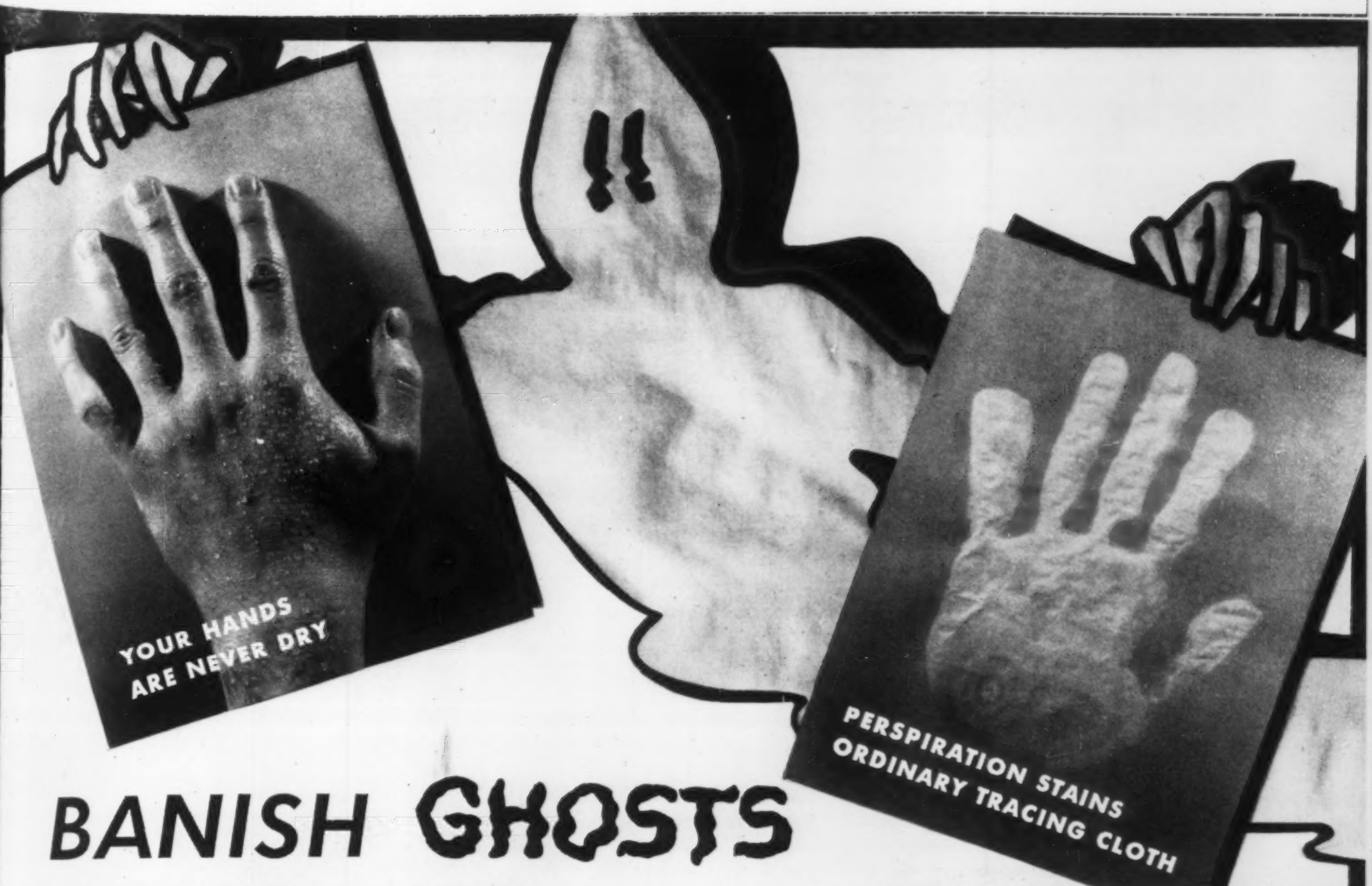
DOUGLAS FIR PLYWOOD
•
Real Lumber
MADE LARGER, LIGHTER SPLIT-PROOF STRONGER

"A PRODUCT OF AMERICA'S ETERNALLY REPLENISHING FORESTS"

INDEX TO ADVERTISERS
ALPHABETICAL

AIR REDUCTION SALES COMPANY . . . 7
ALUMINUM COMPANY OF AMERICA . . . 12
AMERICAN BRIDGE COMPANY . . . 15
(United States Steel Corporation subsidiary)
AMERICAN INDUSTRIES SALVAGE COMMITTEE . . . 19
ARKWRIGHT FINISHING COMPANY . . . 25
BETHLEHEM STEEL COMPANY . . . 13
BUFF & BUFF COMPANY . . . 32
PHILIP CAREY MANUFACTURING COMPANY . . . 29
CAST IRON PIPE RESEARCH ASSOCIATION . *Back Cover*
CELOTEX CORPORATION . . . 27
COMMERCIAL SHEARING & STAMPING COMPANY 31
DOUGLAS FIR PLYWOOD ASSOCIATION . . . 34
ENTERPRISE GALVANIZING COMPANY . . . 31
INTERNATIONAL NICKEL COMPANY, INC. . . . 1
IRVING SUBWAY GRATING CO., INC. . . . 28
JOHNS-MANVILLE CORPORATION . . . 2 and 3
KEUFFEL & ESSER COMPANY . . . 6
KOH-I-NOOR PENCIL COMPANY . . . 29
LAYNE & BOWLER, INC. . . . 26
LOCK JOINT PIPE COMPANY . . . 4
MACARTHUR CONCRETE PILE CORPORATION . . . 10
MACMILLAN COMPANY . . . 32
PERMUTIT COMPANY . . . 21
POLARIZING INSTRUMENT COMPANY . . . 28
PORTLAND CEMENT ASSOCIATION . . . 33
FREDERICK POST COMPANY . . . 23
RAYMOND CONCRETE PILE COMPANY . *Second Cover*
RICHMOND SCREW ANCHOR CO., INC. . . . 8
SERVICISED PRODUCTS CORPORATION . . . 24
SOLVAY SALES CORPORATION . . . 29
SPENCER, WHITE & PRENTIS, INC. . . . 31
TEXAS COMPANY . . . *Third Cover*
TIMBER ENGINEERING COMPANY . . . 5
U. S. STEEL CORPORATION SUBSIDIARY . . . 15
WEST DODD LIGHTNING CONDUCTOR CORPORATION . . . 22
WICKWIRE SPENCER STEEL COMPANY . . . 17
JOHN WILEY & SONS, INC. . . . 29

Index to Products Shown on Pages 32 and 33


YOUR HANDS ARE NEVER DRY
PERSPIRATION STAINS ORDINARY TRACING CLOTH

BANISH GHOSTS

WITH THIS NEW TRACING CLOTH

PHOENIX is the new kind of tracing cloth, proofed against perspiration stains and water marks —*that holds erasure scars at a minimum.* PHOENIX gives you clean tracings, in pencil or ink, free from untidy "ghosts" that reproduce on blueprints!

An exclusive new process is responsible for this amazing performance, a process which defies moisture, and gives PHOENIX its unusually durable working surface. You use harder pencils ... get sharper lines with less tendency to smudge. Even 6H pencil lines show clearly, and reproduce strongly. You don't mar the surface when you erase; erased areas take pencil smoothly —and ink without feathering. Its new white color and its increased transparency provide excellent drawing contrast . . . produce strong blueprints.

Give PHOENIX your own drawing board test. See your K&E dealer, or write for a generous working sample and an illustrated brochure.

PHOENIX DEFIES MOISTURE GHOSTS

Perspiration and water splashes on ordinary tracing cloth create "ghosts" which reproduce on blueprints. PHOENIX Tracing Cloth withstands actual immersion in water for fully 10 minutes at a time! *Perspiration and water marks will not stain it!*

PHOENIX LESSENS SMUDGE GHOSTS

The new improved surface of PHOENIX Tracing Cloth permits you to use harder pencils (5H and 6H) and to get sharper lines with less tendency to smudge.

Result: Cleaner tracings and blueprints.

PHOENIX REDUCES ERASURE GHOSTS

Ordinary tracing cloths become scarred when erased... erased spots produce ghosts on blueprints.

PHOENIX has a durable drawing surface that reduces working scars to a minimum.

K&E
Phoenix
REG. U.S. PAT. OFF.
TRACING CLOTH
for pencil *and* ink

EST. 1867
KEUFFEL & ESSER CO.
NEW YORK · HOBOKEN, N. J.
CHICAGO · ST. LOUIS · SAN FRANCISCO · LOS ANGELES · DETROIT · MONTREAL

Leighton, Frank Carlton (M. '42), Structural Engr., Div. of Buildings, City of Cincinnati, City Hall (Res., 1251 Paddock Hills Ave.), Cincinnati, Ohio.

Manley, Murray Edward (Jun. '42), Box 376, Eads, Colo.

Martin, Alvin Marcile (Jun. '42), Junior Engr., U.S. Engr. Dept., Sante Fe Bldg. (Res., 2220 Ave. O½), Galveston, Tex.

Martin, Robert Gilbert (M. '42), Civ. Engr., 462 West 3d St., Long Beach, Calif.

Mason, Arthur Bradley (Assoc. M. '42), Associate Engr., International Boundary Comm., San Benito, Tex.

Milliken, Donald Leroy (Jun. '42), Asst. Hydr. Engr., U.S. Geological Survey, 945 Post Office Bldg., Boston (Res., 115 Ashland St., Melrose Highlands), Mass.

Millner, Harry Lewis (M. '42), First National Bank Bldg., Morganton, N.C.

Murphy, Howard Austin (M. '42), Asst. Chf. Engr., Administration, Wm. S. Lozier, Inc., 10 Gibbs St., Rochester, N.Y.

Murray, James Vincent (Assoc. M. '42), Squad Leader, Bridge Design Office, State Highway Dept. (Res., 222 North Magnolia Ave.), Lansing, Mich.

Nelson, Lee Edward (Jun. '42), Junior Civ. Engr., U.S. Engr. Office, Davidson Bldg. (Res., East 58th and 50 Highway, R.F.D. 2), Kansas City, Mo.

Ochs, Karl William (Assoc. M. '42), Asst. Chf. Engr., The Rosslyn Steel & Cement Co., 3031 K St., N.W., Washington, D.C. (Res., 5212 Western Ave., Chevy Chase, Md.)

Pace, Clyde Wilson, Jr. (Jun. '42), 2d Lt., U.S. Army, Spartan Aircraft Co., Tulsa, Okla. (Res., 525 Knickerbocker Pl., Kansas City, Mo.)

Parker, Walter Underwood (Jun. '42), Checker, Eng. Dept., Glenn L. Martin Co. (Res., 3424 Dudley Ave.), Baltimore, Md.

Pearson, Einar Otto (M. '42), Chf. Engr., Harland Bartholomew & Associates, 309 Taylor Bldg., Norfolk, Va.

Polk, Martin Collins (M. '42), Civ. Engr., 780 East 7th St., Chico, Calif.

Porter, Omer James (M. '42), Senior Physical Testing Engr., Materials and Research Dept., State Div. of Highways, 3435 Serra Way, Sacramento, Calif.

Pregnoff, Michael Victor (M. '42), Structural Engr., Hall & Pregnoff, 350 California St. (Res., 4530 Balboa St.), San Francisco, Calif.

Pritchard, John Aloysius (Assoc. M. '42), Chf. of Specifications and Contracts Section, E. B. Badger & Sons Co., West Virginia Ordnance Works, Point Pleasant, W.Va. (Res., 544 Second Ave., Gallipolis, Ohio.)

Ruderman, James (M. '42), Cons. Engr., 1860 Broadway, New York (Res., 86–60 One Hundred and Fifth St., Richmond Hill), N.Y.

Skidmore, Robert Wilson (Assoc. M. '42), Chf. Insp., J. B. Converse & Co., Inc., and A. C. Polk, Box 748, Anniston (Res., 1442 Forty-sixth St., Belview Heights, Birmingham), Ala.

Stevenson, Edwin Bonnell (Jun. '42), Junior Hydr. Engr., U.S. Geological Survey, 808 New Post Office, St. Paul, Minn.

Strasmer, Charles Frederick, Jr. (M. '42), Pres., Buffalo Gravel Corp., 19 Hudson St., Buffalo, N.Y.

Sutton, Harold Nelson (Assoc. M. '42), Supt., Park and Recreation Comm., City of Charlotte, City Hall, Charlotte, N.C.

Torp-Smith, Robert Emil (Jun. '42), Lt. (jg), U.S.N.R., U.S.S. *St. Louis*, Care, Fleet Post Office, San Francisco, Calif.

Van Vranken, Harold Douglas (Assoc. M. '42), 2231 North West 2d St., Miami, Fla.

Voelker, Raymond Fred (Jun. '42), Instr., Civ. Eng., Univ. of Wisconsin, Mech. Eng. Bldg. (Res., 2217 University Ave.), Madison, Wis.

Wagner, John William (Assoc. M. '42), Railroad Design Engr., Fraser-Brace Eng. Co., Keystone Ordnance Works, Geneva, Pa.

Wallace, William Joseph (M. '42), Engr. of Design, City Engrs. Office, 410 City Hall (Res., 8925 Dexter Blvd.), Detroit, Mich.

Weber, Adolph Carl (Assoc. M. '42), Sales Engr., Laclede Steel Co., 1317 Arcade Bldg., St. Louis (Res., 8161 Gannon Ave., University City), Mo.

Weikel, Stewart Frederick (Assoc. M. '42), Engr., Van R. P. Saxe, 100 West Monument St. (Res., 722 Washington Blvd.), Baltimore, Md.

White, Henry Randall (Assoc. M. '42), Civ. Engr., E. I. du Pont de Nemours, 11494 Nemours Bldg. (Res., 1810 Wawaset St.), Wilmington, Del.

Wilson, Mark King (Affiliate '42), (Mark K. Wilson Co.), 406 Loveman Bldg., Chattanooga, Tenn.

Zollmer, Frederick Doering (Assoc. M. '42), Dist. San. Engr., Div. of Sanitation, State Div. of Health, 35 State St., Batavia, N.Y.

Membership Transfers

Anderson, Victor Charles (Jun. '24; Assoc. M. '34; M. '42) (Capitol Steel Co.), 329 Gazette Bldg. (Res., 4923 East Crestwood Drive), Little Rock, Ark.

Bickel, John Otto (Assoc. M. '28; M. '42), Chf. Elec. and Mech. Engr., Frederic R. Harris, Inc., 27 William St., New York, N.Y.

Boothe, Perry Mattison (Jun. '32; Assoc. M. '42), Lt., CEC, U.S.N.R., Officer in Chg. Constr., 1007 Am. Industrial Bldg., Hartford (Res., 46 Old Mill Rd., Middletown), Conn.

Brooks, Robert Morris (Jun. '32; Assoc. M. '42), Road Engr., (Associate Highway Engr.), Indian Service, U.S. Dept. of Interior, 445 Federal Bldg., Muskogee, Okla.

Cherry, James Linton (Assoc. M. '36; M. '42), Engr. and Archt. (H. A. Kuljian & Co.), 1518 Walnut St., Philadelphia (Res., 325 Abington Ave., Glenside), Pa.

Coe, Cleveland Beach (Assoc. M. '37; M. '42), Lt. Col., Corps of Engrs., U.S. Army, 100 Spence Pl., Knoxville, Tenn.

Dieter, Frank Louis (Assoc. M. '37; M. '42), County Planning Engr., Arlington County, Court House (Res., 117 North Edgewood St.), Arlington, Va.

Evans, Daniel (Jun. '32; Assoc. M. '42), Executive Engr., Public Works Dept., Onitsha, Nigeria, West Africa.

Fairbairn, Edwin Alexander (Jun. '29; Assoc. M. '36; M. '42), 1st Lt., Air Corps, U.S. Army, 874 Fifty-sixth St., Sacramento, Calif.

Gettys, Paul Eugene (Jun. '30; Assoc. M. '42), Engr., War Dept., Federal Bldg., Pittsburgh (Res., 207 Ingram Ave., Ingram), Pa.

Hayes, Nathaniel Perkinson (Jun. '27; Assoc. M. 34; M. '42), Sales Mgr., Asst. to Vice-Pres., Carolina Steel & Iron Co. (Res., 400 East Greenway), Greensboro, N.C.

Hesselmeyer, Harry Leonard (Jun. '34; Assoc. M. '42), Civ. Engr., Standard Oil Co. of California, 225 Bush St. (Res., 734 Melville Ave., Palo Alto), Calif.

Holober, David George (Jun. '35; Assoc. M. '42), Engr., James Stewart Co. Associates, 71 Vanderbilt Ave., New York (Res., 5204 Nineteenth Ave., Brooklyn), N.Y.

Horwitz, Solomon (Assoc. M. '36; M. '42), Chf. Engr., West End Iron Works, 122 Hampshire St., Cambridge (Res., 78 Watson Rd., Belmont), Mass.

Jenson, Theodore Bruce (Jun. '36; Assoc. M. '42), Senior Engr., U.S. Engrs., Jacksonville, Fla.

Kevan, Glenn Herman (Jun. '37; Assoc. M. '42), Engr., Shipbuilding Div., Missouri Val. Bridge & Iron Co. (Res., 1200 East Powell St.), Evansville, Ind.

Kinney, Joseph Sterling (Jun. '31; Assoc. M. '42), Asst. Prof., Civ. Eng., Rensselaer Polytechnic Inst., Troy, N.Y.

McDowell, Robert Charles (Jun. '35; Assoc. M. '42), Supt., Hunkin Conkey Const. Co., East 12th St., Cleveland, Ohio.

McKnight, James Watson (Jun. '34; Assoc. M. '42), Field Engr., Portland Cement Assn., 1528 Walnut St., Philadelphia (Res., 1319 West 10th St., Erie), Pa.

Malloy, Ambrose John (Jun. '36; Assoc. M. '42); Capt., Corps of Engrs., U.S. Army Area Engr., Del Valle Airfield, Box 998, Austin, Tex.

Marrone, Adolph Alfred (Jun. '36; Assoc. M. '42), Insp. of Constr., Bureau of Yards and Docks, Navy Yard, Brooklyn (Res., 141 Urban St., Mount Vernon), N.Y.

Mathias, Jared Leroy (Jun. '13; Assoc. M. '18; M. '42), Senior Highway Engr., U.S. Public Roads Administration, 720 Phelan Bldg., San Francisco, Calif.

Moehle, Frederick Louis William (Jun. '24; Assoc. M. '29; M. '42), Cons. Engr. and Archt., F. L. W. Moehle and Associates, Professional Bldg. (Res., 2325 Harlem Ave.), Baltimore, Md.

Rentenbach, Thomas Joseph (Jun. '32; Assoc. M. '42), Engr., Special Eng. Div., The Panama Canal, Diablo Heights, Canal Zone.

Schmidt, Lewis Adelbert, Jr. (Assoc. M. '30; M. '42), Acting Constr. Engr., TVA, Hales Bar Dam, Mail Room A, Chattanooga, Tenn.

Senesy, John Joseph (Jun. '36; Assoc. M. '42), Pres., Constr. Service Co., 333 North Broad St., Elizabeth, N.J.

Solander, Arvo Axel (Jun. '38; Assoc. M. '42), 1st Lt., U.S. Army, Camp Robinson, Ark.

Soucek, Edward (Jun. '35; Assoc. M. '42), Senior Civ. Engr., U.S. Engr. Office, Wilmington, N.C.

True, William Howard (Assoc. M. '40; M. '42), Structural Engr., Nichols Eng. & Research Co., 60 Wall St., Tower Room 3000, New York (Res., Pierrepont Hotel, Brooklyn), N.Y.

van de Erve, Jerome (Jun. '38; Assoc. M. '42), Capt., U.S. Army, Chemical Warfare Board, Edgewood Arsenal, Md.

Wait, John Russell, Jr. (Jun. '37; Assoc. M. '42), Supt., Constr., J. S. Abercrombie Co., 2105 Gulf Bldg., Houston, Tex.

Wardwell, Frank Carlton (Assoc. M. '37; M. '42), Project Mgr., Stone & Webster Eng. Corp., Box 1236, Joliet, Ill.

Watson, George Jay (Assoc. M. '21; M. '42), Plant Engr., Am. Bridge Co., Elmira Heights, N.Y.

Wax, Leslie (Jun. '37; Assoc. M. '42), Engr., T. Fred Jackson, Inc., 25 West 43d St., New York (Res., 101 Ocean Parkway, Brooklyn), N.Y.

Westerfeld, Stuart Clarence (Jun. '32; Assoc. M. '42), Capt., Corps of Engrs., U.S. Army Office, Chf. of Engrs., Washington, D.C. (Res., 3000 Lee Highway, Arlington, Va.)

Reinstatements

Fowler, Charles Henry, Assoc. M., reinstated Aug. 13, 1942.

Hay, Francis Haynes, Assoc. M., reinstated Aug. 31, 1942.

McCormick, Alexis, Assoc. M., reinstated Sept. 9, 1942.

Miller, Hiram, M., reinstated Aug. 26, 1942.

Perrot, Emile George, M., reinstated Aug. 19, 1942.

Sands, Robert Lawrence, M., reinstated Aug. 1, 1942.

Silverman, Max, Assoc. M., reinstated Aug. 24, 1942.

Stringfellow, Henry Aylesbury, Assoc. M., reinstated Aug. 31, 1942.

Thatcher, John Howard, M. reinstated Aug. 31, 1942.

Weishoff, Samuel, M., reinstated Aug. 28, 1942.

Wells, Oscar, M., reinstated Aug. 31, 1942.

Whitworth, George Frederick, M., reinstated Sept. 8, 1942.

Young, Charles Addison, Assoc. M., reinstated Aug. 26, 1942.

Resignations

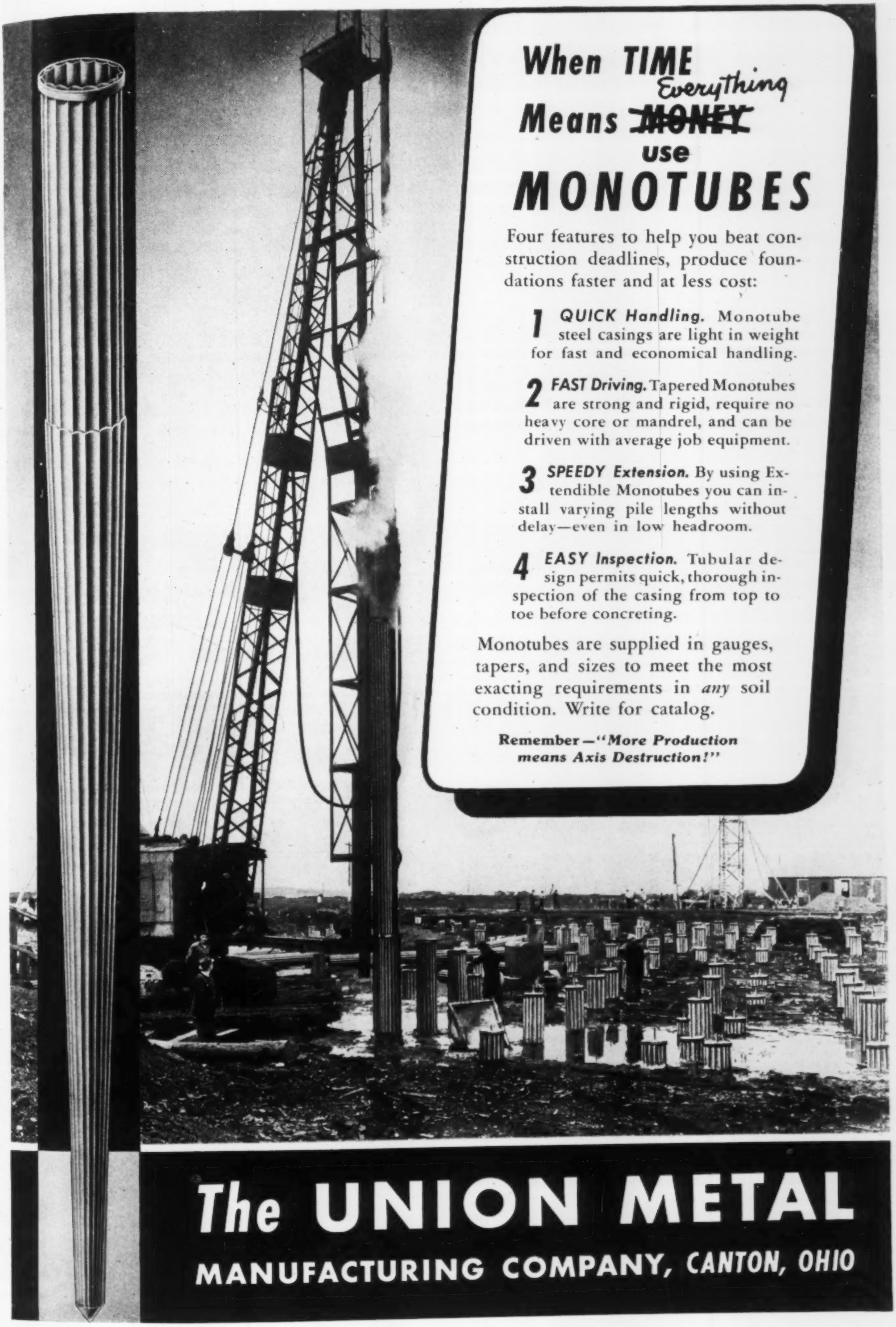
Freeman, William Williams Keen, Assoc. M., resigned Dec. 31, 1941.

Kapp, Clarence Ramsey, Assoc. M., resigned Aug. 25, 1942

Redgrave, Gilbert Richard, Jun., resigned Aug. 17, 1942.

TOTAL MEMBERSHIP AS OF SEPTEMBER 9, 1942

Members	5,839
Associate Members	7,067
Corporate Members	12,906
Honorary Members	35
Juniors	4,996
Affiliates	72
Fellows	1
Total, Sept. 9, 1942	18,010
(Total, Sept. 9, 1941	17,187)



When TIME
Means ~~MONEY~~ Everything
use
MONOTUBES

Four features to help you beat construction deadlines, produce foundations faster and at less cost:

1 **QUICK Handling.** Monotube steel casings are light in weight for fast and economical handling.

2 **FAST Driving.** Tapered Monotubes are strong and rigid, require no heavy core or mandrel, and can be driven with average job equipment.

3 **SPEEDY Extension.** By using Extendible Monotubes you can install varying pile lengths without delay—even in low headroom.

4 **EASY Inspection.** Tubular design permits quick, thorough inspection of the casing from top to toe before concreting.

Monotubes are supplied in gauges, tapers, and sizes to meet the most exacting requirements in *any* soil condition. Write for catalog.

Remember—*"More Production means Axis Destruction!"*

The UNION METAL
MANUFACTURING COMPANY, CANTON, OHIO

Applications for Admission or Transfer

Condensed Records to Facilitate Comment from Members to Board of Direction

October 1, 1942

NUMBER 10

The Constitution provides that the Board of Direction shall elect or reject all applicants for admission or for transfer. In order to determine justly the eligibility of each candidate, the Board must depend largely upon the membership for information.

Every member is urged, therefore, to scan carefully the list of candidates published each month in Civil Engineering *and to furnish the Board with data which may aid in determining the eligibility of any applicant.*

It is especially urged that a definite recommendation as to the proper grading be given in each case, inasmuch as the grading must be based upon the opinions of those who know the applicant personally as well as upon the nature and extent of his professional experience. Any facts derogatory to the personal character or professional reputation of an applicant should be promptly communicated to the Board.

Communications relating to applicants are considered strictly confidential.

The Board of Direction will not consider the applications herein contained from residents of North America until the expiration of 30 days, and from non-residents of North America until the expiration of 90 days from the date of this list.

MINIMUM REQUIREMENTS FOR ADMISSION

GRADE	GENERAL REQUIREMENT	AGE	LENGTH OF ACTIVE PRACTICE	RESPONSIBLE CHARGE OF WORK
Member	Qualified to design as well as to direct important work	35 years	12 years	5 years RCM*
Associate Member	Qualified to direct work	27 years	8 years	1 year RCA*
Junior	Qualified for sub-professional work	20 years	4 years	-
Affiliate	Qualified by scientific acquirements or practical experience to cooperate with engineers	35 years	12 years	5 years RCM*

* In the following list RCA (responsible charge—Associate Member standard) denotes years of responsible charge of work as principal or subordinate, and RCM (responsible charge—Member standard) denotes years of responsible charge of IMPORTANT work, i. e., work of considerable magnitude or considerable complexity.

APPLYING FOR MEMBER

Abell, DeWitt Sterling (Assoc. M.), Montgomery, Ala. (Age 46) (Claims RCA 5.4 RCM 7.2) July 1941 to date Chf. Engr. and Director, Bureau of Sanitation, Alabama Dept. of Public Health; previously with North Carolina State Board of Health, Raleigh, N.C.

Branigan, George Francis, Peoria, Ill. (Age 39) (Claims RC 12.0 D 0.7) Sept. 1927 to Sept. 1942 Instructor (equivalent to Associate Prof.), Kansas State Coll., Manhattan, Kans.; at present Associate Prof. of Gen. Eng., Bradley Poly. Inst., Peoria, Ill.

Bruder, Thomas Eugene, Drexel Hill, Pa. (Age 53) (Claims RCA 14.2 RCM 15.1) Feb. 1942 to date Structural Engr., Carr & Greiner, Archt. Engrs.; previously Asst. Chf. Zone Engr., Zone Constr. Quartermaster, Baltimore; Structural Engr. with Philadelphia Elec. Co., and with Bureau of Water, Philadelphia.

Connell, Harry Hubert (Assoc. M.), Albuquerque, N.Mex. (Age 45) (Claims RCA 9.3 RCM 7.6) Jan. 1942 to date Chf. Engr., Wilson & Co., Cons. Engrs., Salina, Kans.; previously with Paulette & Wilson, Cons. Engrs., etc.

Davidson, James Slater, Jr., Chevy Chase, Md. (Age 36) (Claims RCA 6.3 RCM 6.9) Aug. 1928 to date with Chas. H. Tompkins Co. as Field Engr., Asst. Supt., Asst. to Project Mgr., Chf. Engr., Project Mgr., etc., and (at present) Gen. Supt.

Day, Richard Charles, Rock Springs, Wyo. (Age 41) (Claims RCA 4.0 RCM 9.5) Jan. 1929 to date Chf. Engr., Mountain Fuel Supply Co.

Durham, James Truett, Fort Smith, Ark. (Age 42) (Claims RCA 2.3 RCM 14.5) Aug. 1941 to date in private practice; previously with Arkansas Highway Dept.

Farquharson, Frederick Burt (Assoc. M.), Seattle, Wash. (Age 47) (Claims RCA 10.5 RCM 5.2) Oct. 1925 to date with Univ. of Washington as Instructor, Asst. Prof., Associate Prof., and (since Dec. 1940) Prof. of Civ. Eng.

Fontaine, Elmer Bernard, Margarita, Canal Zone. (Age 42) (Claims RCA 5.4 RCM 10.5) July 1940 to date Prin. Engr., The Panama Canal; previously Engr., U.S. Engrs., Los Angeles, Calif.

Hall, Albert Edmund Stockdale (Assoc. M.), Wilmington, Del. (Age 60) (Claims RCA 3.0 RCM 19.5) March 1918 to date with E. I. Du Pont de Nemours & Co., as Draftsman, Engr., Asst. Constr. Supt., Constr. Supt., and (since Jan. 1931) Project Engr., at present Prin. Archt. and Civ. Engr.

Harrison, Randolph, Fort Worth, Tex. (Age 52) (Claims RCA 11.9 RCM 13.0) July 1941 to date Engr. Examiner, War Public Works, FWA; previously Senior Inspector of Constr., Naval Air Station, Corpus Christi, Tex.; Asst. Res. Engr. and Res. Engr., PWA.

Hiestand, Herbert Harold, Los Angeles, Calif. (Age 48) (Claims RCA 5.0 RCM 5.0) Oct. 1924 to date with Griffith Co., Contrs. as Field Timekeeper, Cost Keeper, Cost Accountant, Engr., and (since Jan. 1937) Asst. Treas.-Engr.

Johnson, Arthur Albert, Milford, N.J. (Age 67) (Claims RCA 3.0 RCM 24.0) July 1942 to date Associate Engr., Corps of Engrs., U.S. Army; previously retired to farming.

Johnston, George Julian, Santa Fe, N.Mex. (Age 48) (Claims RCA 11.3 RCM 7.5) Dec. 1920 to date with New Mexico Highway Dept. in various capacities, since Oct. 1941 Asst. Dist. Engr.

Kearns, Noah Hamilton, Reno, Nev. (Age 41) (Claims RCA 5.0 RCM 9.3) Sept. 1941 to date State Administrator and Director of Operations, FWA (WPA), State of Nevada; previously City Engr., Sparks, Nev.

Leadbetter, Benjamin Cleveland, Culver City, Calif. (Age 62) (Claims RCM 26.6) 1941 to June 1942 Asst. Gen. Supt., Gen. Supt., and Gen. Supervisor of Constr. with Mason & Hanger Constr. Co., New York City; previously with Metropolitan Water Dist. of Southern California.

Leech, Norman Austin, Los Angeles, Calif. (Age 62) (Claims RCM 37.8) Nov. 1940 to date Examining Engr., State Office, WPA, FWA, Jefferson City, Mo.; previously Associate Engr., PWA, FWA, Region No. 4, Omaha, Nebr.

Lopez, Carlos Guillermo, Quito, Ecuador. (Age 47) (Claims RC 18.8 D 5.3) April 1936 to date partner in firm Casa Lopez, Quito; formerly Gen. Mgr. and Engr., Quito Tramways Co.

Martinez Tornel, Pedro, Mexico, D.F. Mexico. (Age 48) (Claims RCA 15.0 RCM 9.0) 1930 to date Prof. of Highways and Railroads, National Univ. of Mexico; also, Asst. Chf. Engr., National Railroads of Mexico, Chf. Constr. Engr., Irrigation Comm., Mexican Govt., and (since Oct. 1941) Director General of railroads under construction.

Marvin, Arthur Sturgess, Chicago, Ill. (Age 39) (Claims RCA 6.9 RCM 9.2) July 1924 to date with American Bridge Co. as Draftsman, Checker, Asst. to Squad Foreman, Asst. Designer, and (since July 1939) Design Engr.

Morgan, Charles Leroy, Watertown, N.Y. (Age 38) (Claims RCA 7.0 RCM 6.0) June 1929 to date with The Wm. T. Field Engrs., Inc.

Moulton, George Lewis, Houston, Tex. (Age 47) (Claims RCA 10.9 RCM 10.6) May 1942 to date Gen. Mgr., San Jacinto Shipbuilders, Inc., Houston, Tex.; previously Gen. Supt., McEvoy Shipbuilding Corporation, Savannah, Ga; Vice-Pres. and Project Mgr., Goode Constr. Corporation; with Alabama Highway Dept.

Myers, Earl Ira (Assoc. M.), Kansas City, Mo. (Age 50) (Claims RCA 6.5 RCM 16.2) May 1935 to date in private practice as Cons. Engr.

Neuffer, George Totten, Dayton, Ohio. (Age 52) (Claims RCM 18.3) April 1923 to date member of firm, Geyer and Neuffer, Archts. & Engrs.

Roberts, James Frank, Knoxville, Tenn. (Age 46) (Claims RCA 4.0 RCM 15.5) April 1936 to date with TVA as Senior Mech. Engr., Prin. Mech. Engr., and (since 1941) Head Hydr. Engr.

Sanders, Shields Brewer, Miles City, Mont. (Age 42) (Claims RCA 0.4 RCM 13.2) March 1931 to date with Montana Highway Comm. as Project Engr., Dist. Res. Maintenance Engr., and (since April 1937) Dist. Engr.

Sandquist, Emil, San Francisco, Calif. (Age 45) (Claims RCA 5.7 RCM 17.9) April 1942 to date Manager of Portland Assembly Center and (since July) Chf. of Operations Sec., Western Defense Command and Fourth Army, Wartime Civil Control Administration; previously Dist. Director and Engr., and State Director of Operations, FWA, WPA.

Snook, Spencer Albert (Assoc. M.), Somerville, N.J. (Age 49) (Claims RCA 12.4 RCM 8.2) June 1942 to date Office Engr., Duffy Constr. Corporation; previously Bridge Designer and Senior Bridge Designer or Chf. Bridge Designer, New Jersey State Highway Dept.

Southworth, Edwin Warren, Miami, Fla. (Age 39) (Claims RCA 5.1 RCM 7.8) July 1940 to date with CEC, U.S.N.R. as Lieut., and since April 1942 Officer-in-Chg. of Constr., U.S. Naval Air Station, Richmond, Fla., at present Lieut. Commander; previously with Metropolitan Dist. Water Supply Comm.

Stepleton, Harold Austin (Assoc. M.), Toledo, Ohio. (Age 43) (Claims RCA 5.5 RCM 13.0) April 1927 to date with H. P. Jones & Co., Toledo, Ohio, as Designing Engr., and (since Jan. 1937) as member of firm.

Swigart, Sherman Tait, Denver, Colo. (Age 42) (Claims RCA 12.1 RCM 7.2) July 1942 to date with Whitman, Requardt & Smith, Engrs., Baltimore, Md.; previously with FWA, War Public Works; with Greeley and Hansen, Engrs., Chicago; FWA, PWA, etc.

Willis, Sumner Chapin, New York City. (Age 53) (Claims RCA 8.3 RCM 18.1) Jan. 1940 to date Gen. Supt., The H. K. Ferguson Co., Inc.; previously with United Engrs. & Constrs., Inc., and Cincinnati (Ohio) Gas & Elec. Co.

APPLYING FOR ASSOCIATE MEMBER

Aldridge, Alfred George, Albuquerque, N. Mex. (Age 42) (Claims RCA 11.6 RCM 5.4) Jan. 1942 to date with Wilson & Co., Engrs., as Chf. Surveyor, and (since April 1942) Engr.; previously Engr., Constr. Ordnance Works, Pryor, Okla.; Fisher, Fisher & Hubbell, Paulette & Wilson, Archt.-Engrs.; with Kansas Highway Comm.

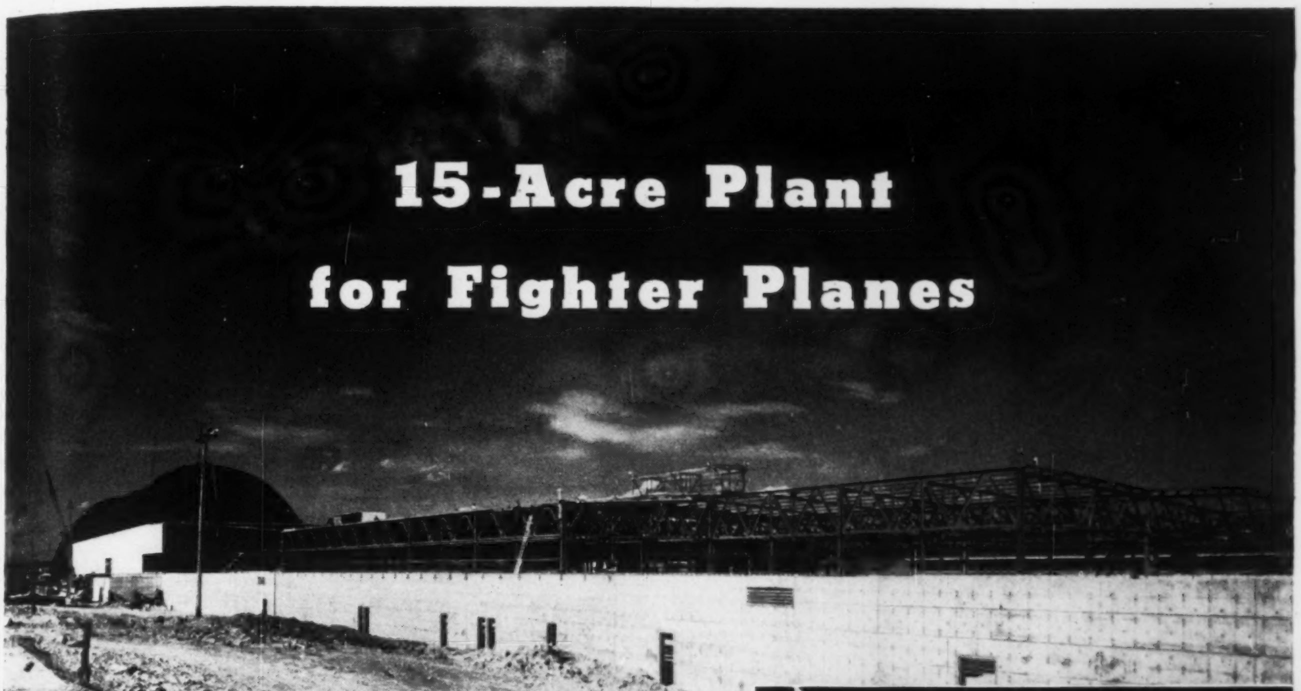
Anderson, Alvin George (Junior), Greenville, S.C. (Age 31) (Claims RCA 3.7) Dec. 1935 to date with SCS as Jun. Engr., Asst. Hydr. Engr., and (since July 1941) Associate Hydr. Engr.

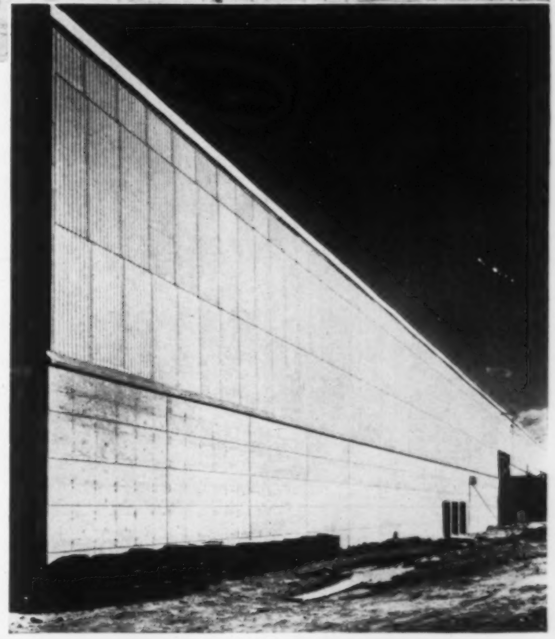
Attridge, William James, Burley, Idaho. (Age 38) (Claims RCA 3.4) March 1934 to date with U.S. Bureau of Reclamation as Instrumentman, Jun. Engr., and (since Jan. 1940) Asst. Engr.

Cummins, Albert Stalfort, Baltimore, Md. (Age 37) (Claims RCA 2.0 RCM 6.5) 1938 to date Pres., Cummins Constr. Corporation; previously Pres., Eng. Contr. Corporation.

Cutler, Herbert Holley, Louisiana, Mo. (Age 40) (Claims RCA 12.9) July 1940 to

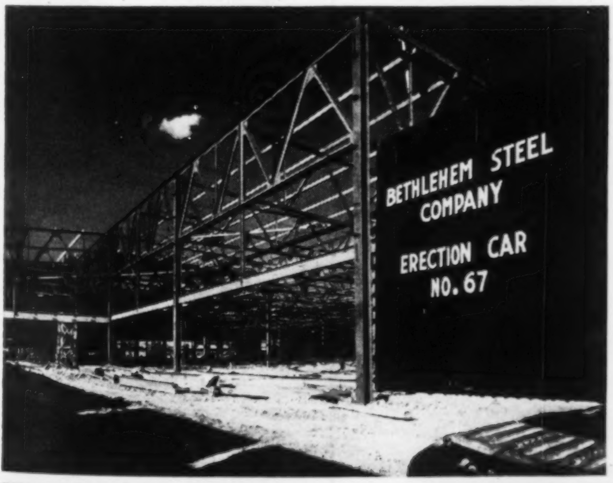
15-Acre Plant for Fighter Planes





Somewhere in America the Sikorsky Plant, shown here, is fast nearing completion. Covering an area of 652,500 sq. ft., this completely windowless, 100 per cent fireproof plant, will soon be turning out large numbers of the new 400 m.p.h., long-range Vought-Sikorsky Corsair fighters for the Navy.

An unusual feature of the Sikorsky Plant is the walls. On the west side of the building, shown above and right, is a bomb-fragment-proof wall, of 10-in. reinforced concrete, 15 ft., 4 in. high. This is designed to provide air-raid protection for employees, as well as protection for emergency hospital, vault, general offices, and other key elements. The other walls of the structure are of corrugated asbestos composition, $5/8$ in. thick, backed up by $1\frac{1}{2}$ in. of insulation. These walls rest on steel girths so that, should a bomb hit, only bays actually demolished need be replaced. Fire curtains are included to prevent the spread of fire to any other section of the plant.



Architects and Engineers: J. Gordon Turnbull, Inc.
Contractors: Clemmer Construction Co.

Construction has provided a 40-ft. ceiling throughout. There are four aisles 1050 ft. long, with 100-ft. spans, and one 450-ft. aisle with a 200-ft. span and two aisles with 100-ft. spans. A cafeteria on the main floor accommodates 600. General offices and storage space are located on a mezzanine which runs along one side of the rectangular structure for a distance of 1000 ft. Fabrication and erection of the 8000 tons of structural steel were carried out by the Bethlehem Steel Company.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

date Field Engr., Bechtel-McCone-Parsons Corporation; previously with Associated Gen. Contrs., So. California; Project Engr., WPA of So. California; etc.

DeBardeleben, Lewis Tyus, Fairhope, Ala. (Age 40) (Claims RCA 6.1 RCM 4.2) Oct. 1941 to date Associate Engr. (Civil), U.S. Army Engrs., Dist. Office, Mobile, Ala; previously with Alabama Highway Dept.

Deutschbein, Harry Dresser, New York City. (Age 33) (Claims RC 4.4) Sept. 1937 to Nov. 1940 as Night and Asst. Supt., and Feb. 1941 to date Vice-Pres. and Pres., H. J. Deutschbein Co., Inc.; in the interim with Walsh Constr. Co.

Diercks, Frederick Otto, Managua, Nicaragua. (Age 30) (Claims RCA 3.0) Sept. 1937 to date with U.S. Army in various capacities, and (since April 1942) Officer-in-Charge, Hydrographic Office, Nicaragua Canal Survey; at present Major, Corps of Engrs.

Eckstein, George Joseph, New York City. (Age 37) (Claims RCA 11.8) Feb. 1929 to date with City of New York in various capacities and (since Jan. 1938) Engr. (Grade 4), Dept. of Public Works.

Evans, William Gurley, Albuquerque, N.Mex. (Age 37) (Claims RCA 4.3 RCM 3.1) Aug. 1941 to date Designer, Wilson & Co., Engrs.; previously with Kansas Highway Comm.

Fischer, Paul, Birmingham, Ala. (Age 35) (Claims RCA 5.5) March 1938 to date Structural Designer, until Oct. 1939 with Lago Oil & Transport Co., Ltd., Aruba, N.W.I. (Standard Oil Co. of New Jersey) and (since Nov. 1939) with Commonwealth & Southern Corporation, Birmingham, Ala.

Francisco, Stephen Cooke (Junior), Syracuse, N.Y. (Age 32) (Claims RCA 4.9 RCM 0.4) March 1941 to date with The J. G. White Eng. Corporation, New York City, since March 1942 as Field Engr.; previously with The John W. Ferguson Co., Paterson, N.J.

Frohock, Fred Clifton, Key West, Fla. (Age 33) (Claims RCA 2.3) Dec. 1940 to date Chf. Eng. Aide to Associate Engr., U.S. Navy Dept.; previously with U.S. Engr. Dept., U.S. Quartermaster Corps, and with WPA.

Fulkerson, Frederic George, Memphis, Tenn. (Age 34) (Claims RCA 2.4 RCM 0.2) Aug. 1939 to Feb. 1940 Engr., and June 1941 to date Asst. Constr. Engr., Schulz & Norton, Archt.-Engrs.; previously with Metcalfe Constr. Co.

Gartner, Lloyd Lacy, New York City. (Age 37) (Claims RCA 10.3) May 1942 to date Chf. Structural Engr., Metcalf & Eddy, Engrs. & Archts.; previously Structural Engr. for various companies.

Giannotti, Alfred (Junior), New York City. (Age 27) (Claims RCA 3.0) Nov. 1940 to date Structural Designer, Linde Air Products Co.; previously Detailer with F. R. MacLeay, Inc., New York City; with City of New York, etc.

Gordanier, John Wedgwood (Junior), Alameda, Calif. (Age 32) (Claims RCA 4.9 RCM 1.5) Sept. 1939 to date Lieut., CEC, U.S. Navy; previously Asst. Engr., U.S. Bureau of Reclamation, Denver, Colo.

Gordon, William Madison, Jacksonville, Fla. (Age 37) (Claims RCA 6.7 RCM 2.8) Sept. 1936 to date Lieut., Civ. Engr. Corps, U.S.N.R.; Oct. 1940 to date with U.S. Navy as Res. Officer in charge of construction, at present at Mayport (Fla.) Section Base and vicinity; previously with U.S. Forest Service.

Heard, Garland Wilson (Junior), Grenada, Miss. (Age 30) (Claims RCA 6.4 RCM 1.6) Aug. 1941 to date with Chas. T. Main, Inc., Archt.-Engrs. as Chf. of Party, Asst. Engr., and (since May 1942) Chf. Surveyor; previously Safety Representative, WPA, Greenwood, Miss.; Owner's Representative with Univ. of Mississippi.

Hogan, John Joseph, New York City. (Age 37) (Claims RCA 5.3 RCM 1.6) Aug. 1942 to date Cons. Engr., Defense Plant Corporation; previously Structural Engr. (Squad Boss), Caribbean Archt.-Engr. (Parsons, Klapp, Brinckerhoff, and Douglas, Cons. Engrs., New York City); Designer and Detailer, The N.Y. Central R.R. Co., New York City.

Houston, Clyde Erwin (Junior), Lincoln, Nebr. (Age 28) (Claims RCA 2.6) Oct. 1938 to date with U.S. Bureau of Agricultural Economics as Jun. Hydr.; Engr. and (since April 1942) Associate Water Planning Analyst, Water Utilization Planning Service; previously Eng. Asst. to Pima County Agent, Arizona Agricultural Extension Service.

Howard, Elkins Mason, Savannah, Ga. (Age 29) (Claims RCA 2.1 RCM 2.5) May 1941 to date Chf. Engr., until Jan. 1942 with Chatham Constr. Co., and since Jan. 1942 with Daniel Constr. Co., both of Savannah; previously Engr. with Claussen-Lawrence Constr. Co., Augusta, Ga., Soloman and Keis, Archt.-Engrs., West Palm Beach, Fla., and Starrett Bros. and Eken, Camp Blanding, Fla.

Hunt, Oliver Parks (Junior), Green Island, Troy, N.Y. (Age 32) (Claims RCA 3.5 RCM 0.5) Sept. 1941 to Sept. 1942 Asst. Engr. (Civ.), Trinidad Dist., War Dept.; previously Engr., U.S. Forest Service, CCC.

Hunter, Loy Ray, Bartlesville, Okla. (Age 32) (Claims RC 6.0 D 1.4) March 1934 to date Engr., Phillips Petroleum Co.

King, Leslie Rufus, Independence, Mo. (Age 35) (Claims RCA 5.5 RCM 5.8) Feb. 1941 to date with U.S. Army, with QM Corps, and (since Nov. 1941) with Corps of Engrs. as Area Engr., and (at present) Major; previously Res. Engr., Kansas Highway Comm.

Leeper, Lyman Denny, Inglewood, Calif. (Age 40) (Claims RCA 10.2) Jan. 1932 to date with Union Oil Co., Los Angeles, as Draftsman, Asst. Engr. and (since Oct. 1940) Constr. Supt.

Leslie, Alexander (Junior), Edinburgh, Scotland. (Age 31) (Claims RCA 1.8) 1939 to date successively with Territorial Army (The Royal Scots) as 2d Lieut., Lieut., and Capt., since 1940 with Royal Engrs. at present appointed to Gen. Staff; previously Asst. Engr., Begg, Peebles & Ross, Cons. Engrs., and J. & A. Leslie & Reid, Civ. Engrs.

McCoid, Joseph Melvin, West Lafayette, Ind. (Age 33) (Claims RC 8.4 D 1.9) Nov. 1934 to date with SCS as Engr., Jun. Engr., Asst. Engr., and (since Oct. 1941) Associate Conservationist.

McCorkle, Nathan Coe, Sacramento, Calif. (Age 40) (Claims RCA 4.8) March 1930 to date with California Div. of Highways as Camp Draftsman, Asst. Highway Engr., Asst. Res. Engr., Res. Engr., and (since Aug. 1939) Asst. Engr.

Medbery, Hiram Christopher (Junior), Millbrae, Calif. (Age 32) (Claims RCA 3.3) Oct. 1936 to date with San Francisco Water Dept., as Inspector, Water Purification Engr., and (since Jan. 1942) Chf. Water Purification Engr.

Merle, John, Jr., St. Louis, Mo. (Age 29) (Claims RCA 4.6) Sept. 1934 to date with Hercules Constr. Co., as Asst. Supt. of Constr., Asst. Supt., Supt., Contr's. Engr., and (since Aug. 1941) Designing Engr.

Michalos, James Peter, Florence, Ala. (Age 30) (Claims RCA 3.7) Nov. 1940 to date Associate Structural Engr., Design Div., Dept. of Chemical Eng., TVA, Wilson Dam, Ala.; previously Office Engr., Michael Pontarelli & Sons, Chicago, Ill.; with Charles W. Cole & Son, Cons. Engr., South Bend, Ind.

Middaugh, Ernest Dale, Saginaw, Mich. (Age 34) (Claims RCA 10.2) April 1942 to date Asst. Engr. and Engr., Green River Ordnance Plant for Simmons, Hazelet & Erdal; previously with Francis Eng. Co., Saginaw, Mich.

Nelson, Philip Page, Williamsburg, Va. (Age 30) (Claims RCA 6.4 RCM 1.9) At present Lieut. (jg), CEC, U.S.N.R., on active duty with Constr. Bn.; previously with Doyle & Russell as Supt.; with Williamsburg Restoration, Inc.

Osborne, Cleo Chilton, Sacramento, Calif. (Age 42) (Claims RCA 4.5) Oct. 1937 to Jan. 1941 and May 1942 to date Jun. Engr., U.S. Engrs. (Army); in the interim Jun. Engr., U.S. Bureau of Reclamation.

Patterson, George Macy, Waco, Tex. (Age 36) (Claims RCA 7.7) April 1942 to date with Bluebonnet Constrs., Archt.-Engr.-Mgr. as Chf. of Survey Party, and (since May 1942) Asst. Field Engr. of Roads; previously with War Dept., U.S. Engrs.; with Howard-Needles-Tammen & Bergendoff, and with Russ & Harrison, both Archt.-Engrs.

Rankin, Emmett Robert, Marshall, Tex. (Age 37) (Claims RCA 4.1 RCM 5.3) Jan. 1942 to date Chf. Draftsman, Ford, Bacon & Davis, Inc., Karnack, Tex.; previously with Prack & Prack, Arch. & Chester Engrs., Texarkana, Tex.; Freese & Nichols, Bastrop, Tex.; Lockwood & Andrews and David M. Duller, Houston, Tex.; with Atlantic Refining Co., Dallas, Tex., etc.

Rock, Elmer (Junior), Atlanta, Ga. (Age 31) (Claims RCA 5.8 RCM 3.2) July 1935 to date with U.S. Engr. Office in various capacities, since June 1941 Associate Engr., South Atlantic Div.

Rodriguez, Hipolito Miguel, New York City. (Age 39) (Claims RCA 7.7 RCM 1.6) April 1942 to date Associate Constr. Engr., U.S. Coast Guard; previously with U.S. FPHA, Washington, D.C.; Gen. Supt., Davila & Llenza, Civ. Engrs. & Contrs., Rio Piedras, Puerto Rico.

Rogers, Franklyn Christopher (Junior), Harrington Park, N.J. (Age 32) (Claims RCA 4.8) Jan. 1941 to date Structural Field Engr., Portland Cement Association; previously Designer and Designing Engr., Ambursen Eng. Corporation.

Rydland, Anton Nelson, Norris, Tenn. (Age 39) (Claims RCA 4.0) June 1941 to date with TVA as Asst. Engr., and (since Feb. 1942) Associate Engr.; previously Designer, State of Tennessee.

Sanzenbacher, William Phillip (Junior), Toledo, Ohio. (Age 32) (Claims RCA 6.2 RCM 0.4) July 1936 to April 1939 Engr., and Feb. 1941 to date member of firm, Forster Wernert & Taylor, Industrial Engrs.; in the interim Senior Engr., Div. of Water, City of Toledo.

Starbuck, Robert Francis, Honolulu, Hawaii. (Age 29) (Claims RCA 3.1) Aug. 1940 to date with Contrs.-Pacific Naval Air Base, Honolulu, Hawaii, as Eng. Designer, Job Capt., and (since Aug. 1941) Associate Structural Engr.; previously with A. S. Barnes, Archt., South Pasadena, Calif.

Thomas, Robert Oliver (Junior), Oahu, Hawaii. (Age 30) (Claims RCA 3.7) July 1940 to date with U.S. Army as 1st Lieut., and Capt., at present with Corps of Engrs. as Asst. Eng. Officer, in charge, Plant Maintenance Dept.; previously Jun. Engr. of Rapid Transit Design, City of Los Angeles; with Edward R. Bowen, Cons. Engr., Los Angeles.

Townsend, John Weaver (Junior), Madison, Wis. (Age 30) (Claims RCA 6.5) Dec. 1935 to date with Consoer, Townsend & Quinlan, Cons. Engrs., as Engr.-Inspector, Field Engr., Res. Engr., etc., and (since April 1942) Chf. Engr.

Weitzel, Fritz August, New York City. (Age 44) (Claims RCA 3.2) Nov. 1939 to date Structural Designer, Eng. Dept., Anaconda Copper Mining Co.; previously Structural Draftsman, Consolidated Edison Co.; Draftsman, Federated Metals Div., American Smelting & Refining Co., Whiting, Ind.

White, Porter J, Vallejo, Calif. (Age 28) (Claims RCA 3.5) April 1941 to date with A. J. Beland, Engr. as Asst. Structural Engr. and (at present) Associate Structural Engr.; previously Asst. Structural Engr., Eng. & Constr. Div., Kentucky State Finance Dept.; Asst. Structural Engr., Kentucky State Dept. of Welfare.

APPLYING FOR JUNIOR

Blanton, Jack Edward, Corpus Christi, Tex. (Age 32) March 1942 to date Draftsman, Myers and Noyes, Cons. Engrs.; previously City Engr., Taft, Tex.; with U.S. Naval Air Training Station; Asst. Field Engr., Washington County Board of Drainage Comm.

Calderon Corleto, Tiburcio, Honduras, Central America. (Age 28) Sept. 1941 in U.S. on scholarship award taking postgraduate courses at Inst. of International Education; 1939 to 1941 Head, Tech. Dept., Almacen Westinghouse; previously with Water Supply Dept. and Water Supply and Electrical Depts.

Cunningham, Luke Alexander, Miles City, Mont. (Age 27) April 1940 to date with Eng. Dept., Chicago, Milwaukee, St. Paul and Pacific R.R. Co. as Rodman, and (since Jan. 1941) Instrumentman.

Haulenbeek, Garrie Beazley, Somerville, N.J. (Age 28) (Claims RCA 0.6) April 1942 to date Superv. Engr., Construction Service Co., Inc., Elizabeth, N.J.; previously with Bakelite Corporation, Bound Brook, N.J.; The Austin Co., New York City, and U.S. Gypsum Co., Chicago, Ill.

McLaughlin, John Colwell, Honolulu, Hawaii. (Age 27) June 1941 to date Structural Eng. Draftsman, Contrs.-Pacific Naval Air Bases, Pearl Harbor, Hawaii; previously Transitman and Field Engr., Power and Constr. Eng. Dept., Ford Motor Co., Dearborn, Mich.

Maughan, William Reid, Los Angeles, Calif. (Age 26) (Claims RCA 0.2) Oct. 1940 to date with U.S. Engr. Office, as Jun. Engr., and (since July 1942) Asst. Engr.; previously with U.S. Dept. of Reclamation and U.S. Dept. of Agriculture.

Nopper, Ralph Jacob, Toledo, Ohio. (Age 26) July 1940 to date Engr., Constr. Dept., Libbey-Owens-Ford Glass Co.; previously with Howard Baker Co., Toledo, and E. B. Badger & Sons Co., Boston.

Seifert, Raymond August, Atlanta, Ga. (Age 28) Nov. 1940 to date with Corps of Engrs., U.S. Army, as Asst. Post Utilities Officer, and (since April 1942) Asst., Repairs and Utilities Branch, Office of Div. Engr., So. Atlantic Div., at present 1st Lt.

Stafford, Paul Jordan, Oakland, Calif. (Age 28) (Claims RCA 1.2) June 1941 to date with The Henry J. Kaiser Co. in various capacities, at present in charge of Oakland office during temporary absence of Chf. Engr.; previously with A. G. Raisch, Contr., San Francisco, Calif.

Standley, James Gleason, Jr., Sacramento, Calif. (Age 27) July 1938 to date with Bridge Dept., California Div. of Highways, Dept. of Public Works as Senior Eng. Aide, Jun. Bridge Engr., and (since July 1942) Asst. Bridge Engr

WILL OUR MEN LOSE BATTLES FOR LACK OF STEEL?

WAR *IS* HELL! Yet this war could be worse than hell. Crucial battles will be lost and needless thousands of lives sacrificed unless our fighting men get all the equipment they need.

LET'S LOOK AT THE FIGURES: Most of this equipment is largely made of steel. Our steel industry made sixty-seven million tons in 1940. It produced eighty-three million tons in 1941. *Yet we need still more.* This year the steel industry *can* produce ninety million tons if you and other Americans will *gather up* and *turn in* six million *additional* tons of scrap.

WHY SCRAP IS NEEDED: New steel is made from scrap iron and pig iron—about half and half. Because the scrap has already been refined it cuts down priceless production time.

WHAT CAN *YOU* DO? Plenty! Gather up all worn-out or obsolete tools, equipment and other useless materials. Urge your associates to do the same. Then call the scrap dealer. He'll hurry it off to the steel mills. All scrap will be purchased by the steel industry at government-controlled prices.

BACK UP OUR FIGHTING MEN: The least you can do for our fighting men, perhaps one close to you, is give them the equipment they *must* have. Every minute is precious. Get in the scrap—fast. Armco Drainage Products Assn., Middletown, Ohio.

★ ★ ★ ARMCO ★ ★ ★

This advertisement is in support of the Salvage Program of the Conservation Division of the War Production Board.

Stein, Arthur Alexander, Far Rockaway, N.Y. (Age 29) (Claims RCA 4.8 RCM 0.4) Nov. 1941 to date Designer, Fred R. Harris, Inc., Cons. Engrs., New York City; previously with City of New York in various capacities.

Yankoff, Victor, Honolulu, Hawaii. (Age 29) July 1941 to date Prin. Eng. Draftsman, U.S. Engr. Dept.; previously Jun. Civ. Engr., Public Works; Jun. Structural Engr., Hawaiian Dredging Co., etc.

1942 GRADUATES

ALA. POL. INST.
(B.S. in Civ. Eng.)

Age
Smith, Arthur Martin (21)

CORNELL UNIV.
(B.C.E.)

Burton, Fredric Cady (22)

UNIV. OF DETROIT
(B.C.E.)

Davis, Robert Jerome (22)

UNIV. OF HAWAII
(B.S. in C.E.)

Ja, Fu Hoon (22)

IOWA STATE COLL.
(M.S. in Civ. Eng.)

Kopfler, William Frederick, II (22)

(Also 1941 B.S. in Civ. Eng., Southwestern Louisiana Inst.)

THE JOHNS HOPKINS UNIV.
(B.E.)

Schaible, Gorman Franklin (20)

UNIV. OF KY.
(B.S. in Civ. Eng.)

Boston, George William (24)

MICH. COLL. OF MIN. AND TECH.
(B.S. in C.E.)

Walker, Fred Mallett, Jr. (21)

MICH. STATE COLL.
(B.S.)

Blanchard, James Edwin (24)

MO. SCHOOL OF MINES & MET.
(B.S. in C.E.)

Hopkins, Rex Lee (22)
Quick, Jack Woodrow (23)
Vogelgesang, Edwin Charles (22)

UNIV. OF MO.
(B.S. in C.E.)

Koch, Howard Frederic (21)
Vincent, James Campbell (27)

UNIV. OF NEV.
(B.S. in C.E.)

Johnson, Knute Harold (30)

COLL. OF CITY OF N. Y.
(B.C.E.)

Fiegen, Michael (22)

N. Y. UNIV.
(B.C.E.)

de Ryss, Emil Bohdan (23)

OHIO STATE UNIV.
(B.C.E.)

Motz, Joseph Sieber (22)

PRINCETON UNIV.
(B.S. in Eng.)

Hazzard, Charles Bullock, Jr. (22)
Kee, Robert Munson (22)

PURDUE UNIV.
(B.S.C.E.)

Boughan, Rolla Beryl (21)
Osterling, Blaine Warren (23)

STANFORD UNIV.
(A.B.)

Peck, Clair Leverett, Jr. (21)

SYRACUSE UNIV.
(B.S. in Civ. Eng.)

Curtin, Joseph Raymond, Jr. (22)

The Board of Direction will consider the applications in this list not less than thirty days after the date of issue.

Engineering Societies Personnel Service, Inc.

NEW YORK
31 W. 39TH ST.

CHICAGO
211 W. WACKER

DETROIT
FARNSWORTH AVE.

SAN FRANCISCO
57 POST ST.

BOSTON
4 PARK STREET

The items listed below have been furnished by the Engineering Societies Personnel Service, Inc., which is under the joint management of the Four Founder Societies. This service is available to members and is operated on a cooperative, non-profit basis. In applying for positions advertised by the Service the applicant agrees, if actually placed in a position through the Service as a result of these advertisements, to pay a placement fee in accordance with the rates as listed by the Service. These rates have been established in order to maintain an efficient, non-profit personnel service and are available upon request. This also applies to registrants whose notices are placed in these columns. All replies should be addressed to the key numbers indicated and mailed to the New York Office.

A weekly bulletin of engineering positions open is available to members of the cooperating societies at a subscription of $3 per quarter or $10 per annum, payable in advance.

MEN AVAILABLE

Engineer; M. Am. Soc. C.E.; B.S.C.E.; LL.B.; retiring from government service; 34 years' experience on railroad location, construction, and valuation; highway planning and mapping; position desired as assistant or associate professor of subjects related to those of experience. Location, East preferred. C-939.

Graduate Civil Engineer; M. Am. Soc. C.E.; over 25 years' experience on building construction as a member of construction firm and executive; wide administrative and supervisory experience. Looking for position for the duration where experience and ability can assist in the war effort. Available promptly. Location, immaterial. C-940.

Civil Engineer; M. Am. Soc. C.E.; 3 years on B.S.C.E.; seeks responsible position as project manager, construction engineer, or inspector; 23 years' experience in construction of buildings, streets, sewers, roads, etc., as resident engineer, district engineer, and state director of reconstruction division; also experienced in engineering organization administration and personnel management. Location, central. C-941.

POSITIONS AVAILABLE

Superintendent to handle the erection of large contracts covering oil refinery equipment. Location, New Jersey. W-342.

Civil or Mechanical Engineer, 45–55, with 10 years' heavy construction experience for government work to advise contractors, construction engineers, etc. Must be sufficiently versed to meet top people, size up in a day's time progress and state of affairs of a job, and make sensible comments and suggestions. Considerable traveling. Salary, $3,800–$5,600 a year. W-410.

Structural Steelwork Designer capable of analyzing stresses in cable-supporting structures; knowledge of mechanical design and equipment desirable. Salary open. Location, Connecticut. W-526.

Civil Engineers, 40–45, qualified to supervise survey and topographical work and to make soil boring tests and load tests. Should have had several years' definite experience in field layout for the construction of iron and steel plants and civil engineering work pertaining to the installation and erection of equipment for such plants. Location, northern South America. W-687.

Mechanical or Civil Engineers, young, who have had some experience on construction or maintenance of petroleum refineries. Permanent. Salary open. Location, New York, N.Y. W-764.

Instrumentman and Chief of Party on large construction project. Duration, at least one year. Salary, $3,600–$4,800 a year. Location, foreign. W-773.

Supervising Engineers, civil, to coordinate activities of engineers on the inspection of construction projects, primarily industrial buildings. Will also approve invoices and payrolls. Salary, $2,600–$3,800 a year. Location, anywhere in United States. W-787.

Graduate Civil Engineers (Recent) for field construction and general layout work. Will take a few with construction experience. Salary, $2,080–$3,380 a year. Location, South. W-812.

Instructor in Civil Engineering, young; prefer man who has had extracurricula work and about one year's teaching experience. Permanent. Salary, $1,800 a year. Location, West. W-817.

Instructor in Civil Engineering primarily to teach engineering drawing, descriptive geometry, and surveying. Basic salary, $2,100, but could earn in excess of $2,400 by teaching war training courses. Location, Maryland. W-1068(*a*).

Instructors to teach engineering drawing and descriptive geometry. Prefer young engineering graduates but will consider older men with proper qualifications. Salary, $1,800–$3,000 for 9 months' service, depending upon qualifications. Location, Illinois. W-1076.

Engineers, young, with concrete construction experience to supervise the application of Vacuum Process on defense jobs. Salary open. Traveling expenses and living allowance paid in addition to salary. Location, Pennsylvania. W-1077.

Civil Engineers to design town-site project. Should have experience in roadways, sanitation, water supply, sewage—in either one or all. Location, New York, N.Y. W-1101.

Inspectors who have had experience with wood-stave water pipe. Will consider older men. Location, Pennsylvania. W-1120.

Topographic Engineer experienced in map making. Must be resident of New Jersey. Temporary appointment; permanent subject to competitive Civil Service examination. Salary, $3,600 a year. Location, New Jersey. W-1124.

Commissioned Officers for the Army Specialist Corps, mainly Second Lieutenants. Desire graduate engineer or equivalent, preferably mechanical and automotive, though will consider civil and electrical engineers. Practical experience desired but recent graduates will be accepted. Should be conversant with the technique of rendering technical reports involving engineering analysis, diagnosis, and prognosis. Salary, $2,600 a year. Location, South. W-1129.

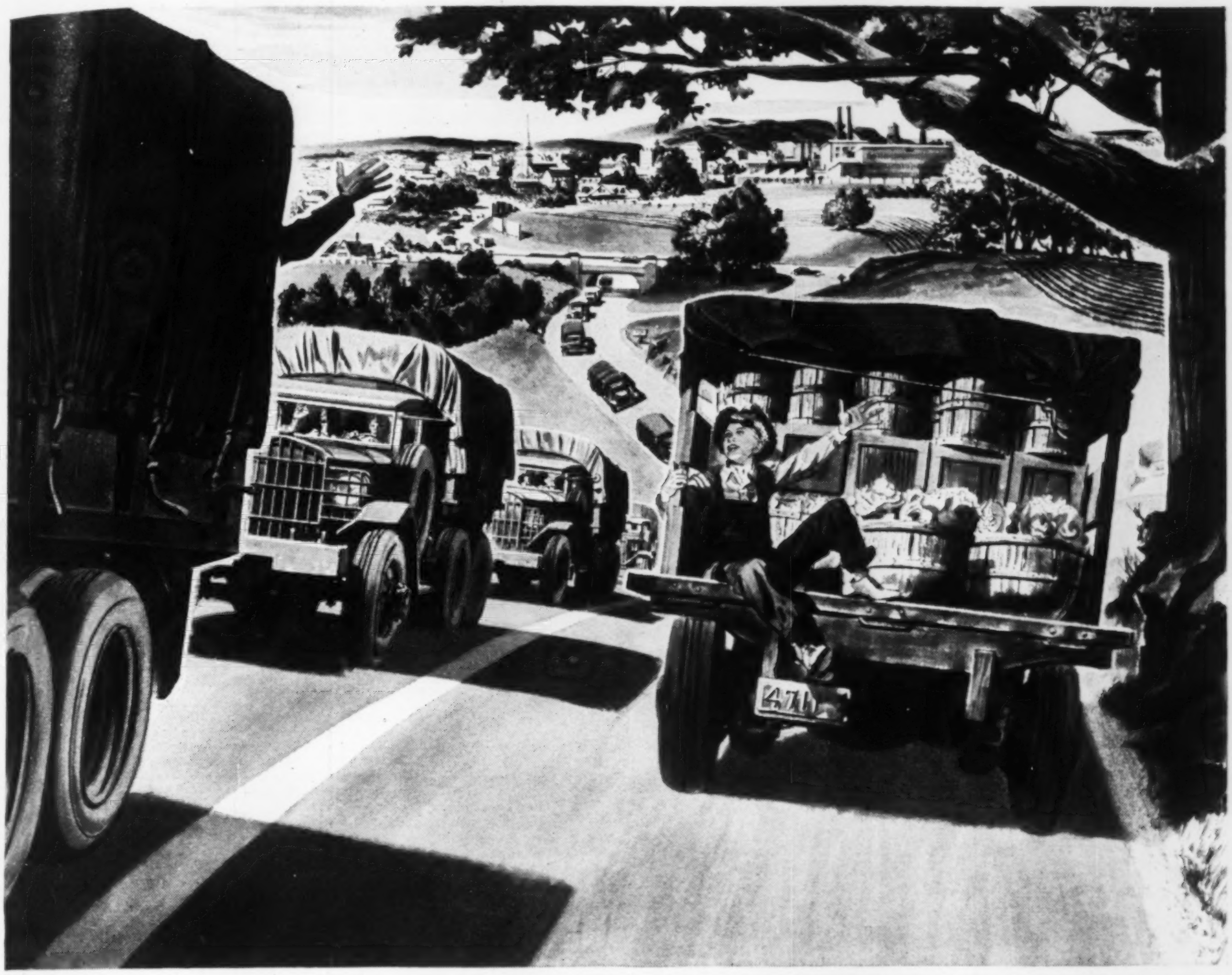
Construction Engineer to do field layout, interpretation of plans, and supervision. Duration 3 to 4 months, with possibility of being transferred to other projects upon completion. Salary, $4,056 a year. Location, Ohio. W-1143.

Topographic Engineer, temporary, about 6 months. Salary, about $3,000 a year plus subsistance. Location, Virginia. W-1152.

Assistant Professor of Civil Engineering to teach mechanics of materials, surveying, and materials testing. Prefer good laboratory man with practical and teaching experience and advanced degree. Salary, $1,745 with quarters for married men. Location, Southeast. W-1172.

Instructors, civil engineers, to teach civil engineering, freshman drawing, and surveying. Permanent. Salary open. Location, New York Metropolitan Area. W-1179.

Field Engineer who is capable of running the office and of handling the plotting of surveys, and the layout of roads and sewer and water lines. Salary, about $4,200 a year. Apply to the Personnel Service for application blanks. Location, foreign. W-1184 (*b*).



This illustration is taken from a Barrett Tarvia advertisement in The Saturday Evening Post which emphasizes the vital importance of the war-time maintenance programs of America's highway engineers and contractors.

FEEDER ROADS ARE FIGHTER ROADS AS WELL

One of America's most valuable weapons of war is the all-weather highway that links farm to market and village to city, across the length and breadth of our land.

Today, these roads are doing double duty in the cause of victory. For over them, night and day, travels an endless stream of farm trucks from the arsenal of food—and over them, too, move fighting men and fighting materials to a thousand strategic centers of war. They are a vital part of America's 75,000 mile "Strategic Network" of military access and tactical roads.

It is especially important that these roads be maintained in first class condition for the duration. It's a responsibility of every highway engineer and contractor—a huge problem of maintenance on which Tarvia and the Tarvia field man can help you.

For nearly 40 years Tarvia has been helping highway engineers get the most out of available highway funds. This universal tar paving material is being used with outstanding success to extend the life and service of all types of highways. It has proved the sound economy of "stitch-in-time" road work that saves heavy replacement costs.

Why not discuss your road problems with the Tarvia field man? You'll find him ready with helpful cooperation, based upon Barrett's unmatched experience with road construction, repair and maintenance. Phone, wire or write our nearest office.

Barrett Tarvia*

*REG. U. S. PAT. OFF.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK

Chicago . . . Birmingham . . . St. Louis . . . Detroit . . . Philadelphia
Boston . . . Providence . . . Rochester . . . Lebanon, Pa. . . . Minneapolis
Cleveland . . . Columbus . . . Youngstown . . . Toledo . . . Syracuse . . . Hartford
Norwood, N.Y. . . . Cincinnati . . . Buffalo . . . Bethlehem . . . Portland, Me.
In Canada: THE BARRETT COMPANY, LTD., Montreal . . Toronto . . Winnipeg . . Vancouver

. . . ONE OF AMERICA'S GREAT BASIC BUSINESSES

CURRENT PERIODICAL LITERATURE

Abstracts of Articles on Civil Engineering Subjects from Publications (Except Those of the American Society of Civil Engineers) in this Country and Foreign Lands

Selected items for the current Civil Engineering Group of the Engineering Index Service, 29 West 39th Street, New York, N.Y. Every article indexed is on file in The Engineering Societies Library, one of the leading technical libraries of the world. Some 2,000 technical publications from 40 countries in 20 languages are received by the Library and are read, abstracted, and indexed by trained engineers. With the information given in the items which follow, you may obtain the articles from your own file, from your local library, direct from the publisher, or they may be borrowed from the Engineering Societies Library. Photoprints will be supplied by this library at the cost of reproduction, 25 cents per page to members of the Founder Societies (30 cents to all others), plus postage, or technical translations of the complete text may be obtained at cost.

DAMS

Concrete Gravity, Maintenance and Repair. Stopping Leakage Under Hales Bar Dam, C. H. Vivian. *Compressed Air Mag.*, vol. 47, no. 6, June 1942, pp. 6749–6755. Dam is on Tennessee River 33 miles downstream from Chattanooga, Tenn.; length 2,315 ft, of which 1,200 ft is concrete spillway, 371 ft is concrete power house and navigation lock, and 744 ft is earth embankment; dam rests on limestone strata interbedded with thin shale layers; details of method for placing vertical curtain of concrete in foundation rock just upstream from dam, to stop water from flowing underneath structure.

Earth, California. Rolled Earth Fill Forms 2,500,000-cu yd Sepulveda Dam for Flood Protection at Los Angeles. *Construction Methods* vol. 24, no. 6, June 1942, pp. 52–53 and 124. Dam across Los Angeles River, designed for flood control in area of Los Angeles, Calif.; structure is 15,000 ft long on its crest, has maximum height of 50 ft, and contains 2,500,000 cu yd of compacted embankment, with 3-on-1 slope on upstream and 4-on-1 slope on downstream faces.

Earth, Reconstruction: No Time Lost in Reconstruction of Willow Creek Dam, H. V. Pehrson. *Pacific Bldr. & Engr.*, vol. 48, no. 4, Apr. 1942, pp. 36–38 and 40. Reconstruction of dam described, with particular attention to time clauses of contract; contract allowed only 30 days for completion of earth blanket on north abutment, 75 days to complete reconstruction of outlet works, and 170 days in which to complete entire project (situated near Augusta, Mont.).

Earth, Texas. "All Out" Dirt Moving At Dension Dam, S. Jones. *Excavating Engr.*, vol. 36, no. 5, May 1942, pp. 242–245, 254, 256–258, 260, and 262. Digging, hauling, and compacting operations performed by the Guy F. Atkinson Co. in fulfilling 30,000,000-yd contract.

Hydraulic-Fill, Alaska. Alaska's Largest Hydraulic Fill Dam, C. Bryant. *Pacific Bldr. & Engr.*, vol. 48, no. 5, May 1942, pp. 39–40. Description of Hess Creek Dam being built by Livengood Placers, Inc. (division of Goldfields Consolidated of San Francisco) in order to overcome handicap of perpetual water shortage.

Reservoirs, Ontario. New Filtered-Water Reservoir at Windsor, Ont. Adds 2.3 M. G. to Storage Capacity, J. C. Keith. *Water & Sewage*, vol. 80, no. 5, May 1942, pp. 11–15 and 44–45. Illustrated description of 2.3-million gal reinforced concrete reservoir constructed as stand-by equipment of Windsor filtration plant.

Rock-Fill, Australia. Enlargement of Eildon Reservoir. *Commonwealth Engr.*, vol. 29, no. 10, May 1, 1942, pp. 249–250. Eildon reservoir on Goulburn River, Victoria, Australia, has capacity of 306,000 acre-ft and supplies water for irrigation over area of 1,250,000 acres in northern Victoria; extracts from report of J. L. Savage, dealing with practicability of increasing storage to about 918,000 acre-ft by raising dam to hold water to maximum depth of 175 ft by construction of earth and rock-fill dam immediately downstream.

Spillways, Reconstruction. Reconstructing Spillway, R. C. Kennedy. *Western Construction News*, vol. 17, no. 4, Apr. 1942, pp. 158–159. Necessity for reconstruction of San Pablo Dam spillway provided East Bay Municipal Utility District with opportunity of re-designing 20-year-old channel 1,500 ft long with 155-ft drop; model studies used to check design.

FOUNDATIONS

Excavation, Shoring. Special Shoring for Building Excavation. *Eng. News-Rec.*, vol. 129, no. 1, July 2, 1942, pp. 16–17. Steel H-beams were driven to toe-hold in soft rock and tied back to pile anchors that utilize existing pavement to hold banks for excavation of steam plant substructure in Washington, D. C.; horizontal breast boards are used back of vertical beams to depth where wellpoints are required, then they are set just inside exterior flanges and wellpoints driven back of them; reshoring, as structure rises, is done to obviate necessity for struts through concrete.

Piles, Driving. Deep Foundations and Use of Driven Piles, M. G. Dempster. *Commonwealth Engr.*, vol. 29, nos. 9 and 10, Apr. 1, 1942, pp. 217–224, and May 1, pp. 241–246. Piles are not commonly used when water or loose silt overlies hard rock, into which piles cannot be driven; for other conditions piles are preferred to caissons, because of speed of construction and lower cost; pile types; bearing capacity; quantitative resistance; cast-in-place piles; sheet piles; precast concrete piles; bonding heads on concrete piles; pile costs; handling and driving costs.

Soils, Consolidation. Rolled Earth-Fill Foundations—Supports Concrete Housing Units, W. W. Moore. *Western Construction News*, vol. 17, no. 5, May 1942, pp. 201–204. Mat constructed over mud flats so soft that no bearing test could be obtained provides satisfactory foundation for naval housing project on Pacific Coast; actual settlement records agree closely with pre-construction computations.

Soils, Mechanics. Factors Entering Into Determination of Allowable Loads on Chicago Subsoils, R. B. Peck. *Western Soc. Engrs.—J.*, vol. 47, no. 2, Apr. 1942, pp. 69–78. Simple non-mathematical statement of basic factors that enter into design of Chicago spread foundations, so that practical engineer can form background into which he may fit more detailed information.

Soils, Stabilization. Studies of Soil-Aggregate Base Course Mixtures, J. B. Garneau and C. E. Beland. *Roads & Streets*, vol. 85, no. 6, June 1942, pp. 56 and 58. Effects of variable gradation, moisture content, and admixtures upon strength and stability of soil aggregate; base course mixtures are presented in tabular form.

HYDROLOGY AND METEOROLOGY

Runoff. Short Method of Determining Volume of Runoff from Water-Stage Recorder Charts, T. L. Copley. *Agric. Eng.*, vol. 23, no. 6, June 1942, pp. 189 and 192. Method proved accurate on rectangular and circular charts; it provides check where conventional method is necessary in determining rates of runoff and in preparation of hydrographs; area under runoff graph is divided into horizontal intervals, and discharge rate for each interval is multiplied by average length of duration of strip; use of method. Before Am. Soc. Agric. Engrs.

Shore Protection. Beach Erosion Study at Coronado, Calif. *Shore & Beach*, vol. 10, no. 1, Apr. 1942, pp. 8–11. Investigation by beach erosion board in connection with San Diego Harbor improvement program.

Soils, Stabilization. Low Cost Vegetative Stabilization of Highway Slope Cuts and Fills, H. D. Bowers. *Calif. Highways & Pub. Works*, vol. 20, no. 5, May 1942, pp. 8–11 and 15. Review of methods of low-cost vegetative erosion control under varying conditions with special reference to new construction in Santa Cruz County, California, where cut slopes were designed at $1^1/_2$ to 1.

Water Distribution Systems, Earthquake Effect. Effect of Earthquakes on Water Distribution Systems, C. G. Hyde. *New England Water Works Assn.—J.*, vol. 56, no. 1, Mar. 1942, pp. 14–37. Subject suggested by reason of recent earthquakes of noticeable severity in New England area; sources of information on earthquake effects; effects on distribution systems based on experience in California; report of Committee of Am. Soc. C.E.

IRRIGATION

Canals, Columbia Basin. Columbia Basin Irrigation Canals, H. A. Parker. *Reclamation Era*, vol. 32, no. 4, Apr. 1942, p. 77. Preliminary survey of irrigation system shows that ultimately it will serve 1,200,000 acres of fertile land in south-central Washington and offer opportunity for home and livelihood to between 350,000 to 400,000 people; post-war considerations.

Canals, Concrete Lining. Lining Lateral Canals, E. C. Rounds, E. L. Forte and W. R. Fry. *Reclamation Era*, vol. 32, no. 4, Apr. 1942, pp. 89–90. Reasons for selection of pre-cast concrete slab linings for Yuma Project in California; description of plant erected to provide slabs and reinforced tile.

Canals, Lining. Three Earth Canal Linings, T. M. Leps. *Western Construction News*, vol. 17, no. 6, June 1942, pp. 251–253. Hydraulically placed silt and clay, compacted earth, and compacted bentonite-earth canal linings have been studied in Bureau of Reclamation Laboratory as means of reducing seepage losses.

LAND RECLAMATION AND DRAINAGE

Australia. Note on Use of Drainage Water, A. L. Tisdall. *Australia Council Sci. & Indus. Research—J.*, vol. 14, no. 4, Nov. 1941, pp. 260–263. In irrigation settlements of Mildura, Red Cliffs, Merbein, and Coomealla, drainage schemes provide each property with facilities for removing underground drainage water; situation has now arisen in which main drains—particularly during irrigation periods—are carrying large quantities of water away from irrigation settlements; it is becoming increasingly necessary to conserve water; inquiry and conclusions drawn.

Roads and Streets. Design of Roadside Drainage Channels, C. F. Izzard. *Pub. Roads*, vol. 23, no. 1, Mar. 1942, pp. 1–4 and 13–14. Report presents procedure for analyzing drainage problems: First, estimating peak rate of runoff from each drainage area contributing to channels along highway; second, checking ability of these channels to carry estimated discharge without eroding or overflowing; and third, designing protection against erosion or designing modified channel section for increased capacity where necessary.

Roads and Streets. Drainage Solves Problem. *Better Roads*, vol. 12, no. 5, May 1942, pp. 19–20. Cause of side-hill slide that resulted in damage and inconvenience on Indiana state highway removed by subdrain installation.

MATERIALS TESTING

Girders. Heavy Load Tests on Plywood Girder, C. W. Muhlenbruch. *Eng. News-Rec.*, vol. 129, no. 1, July 1942, pp. 31–33. Tests on 18-ft plywood girder designed for heavy loading used in highway bridge design were conducted recently in civil engineering laboratory of Carnegie Institute of Technology; results of tests are given, with conclusions as to principles to be applied in design of plywood girders for such loadings when assembled with ring connectors for actual service in field.

PORTS AND MARITIME STRUCTURES

Dry Docks, Cape Town, South Africa. Big Dry Dock for Cape Town. *Engineer*, vol. 173, no. 4508, June 5, 1942, pp. 468–469. Dimensions of dock are not quite settled but it will not be less than 1,000 ft long, 45 ft deep, and may be large enough to accommodate "Queen Mary" and "Queen Elizabeth."

Piers, Construction. Laminated Decking Speeds Pier Construction. *Eng. News-Rec.*, vol. 128, no. 25, June 18, 1942, pp. 976–979. Designed to speed erection and protect deck concreting in winter, laminated-timber sub-deck has been successfully used on 90-ft wide pier over deep water and 41-ft wide approach trestle, built for Corps of Engineers, U.S. Army; untreated timber piles, up to 90 ft long, were driven in twenty-five pile bents, 10 ft cc, to form 90-ft wide pier that carries four lines of railroad track.

ROADS AND STREETS

Airport Runways, Paving. Paving Runways at Half Mile a Day Clip. *Eng. News-Rec.*, vol. 129, no. 1, July 1942, pp. 18–19. Using single battery of equipment, contractor paved 2,200 ft of concrete runway strips 25 ft wide day after

CONTINUOUS RESEARCH HELPS YOU GET YOUR MONEY'S WORTH IN CONCRETE

LONE STAR CEMENT CORPORATION
94 LBS NET
PORTLAND CEMENT
INCOR
94 LBS. NET
HIGH EARLY STRENGTH PORTLAND CEMENT

CONTINUING product research and rigid production control account for outstanding Lone Star and 'Incor' performance—cement performance today exceeding that of fifteen years ago by a substantial margin.

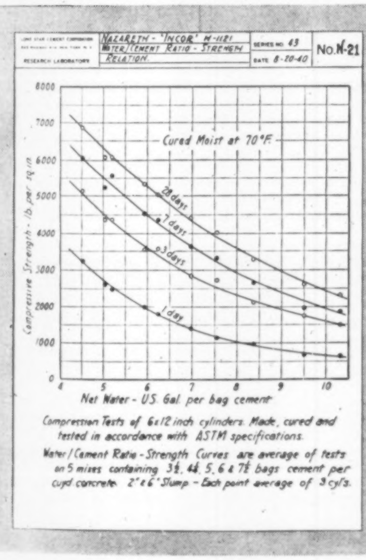
To help define the properties of these modern, high-quality Portland cements in terms of performance in concrete, the Lone Star Research Laboratory during 1940-41 tested 15,510 6"x12" cylinders, 1,410 6"x6"x3" blocks, and 2,820 3"x3"x12" beams—a total of 19,740 tests.

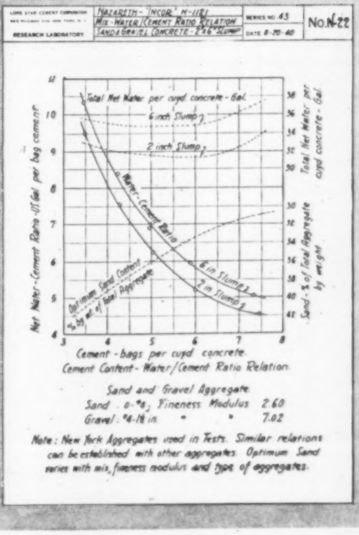
These tests provide up-to-date data on compressive strength, on durability as indicated by resistance to freezing and thawing, and on volume change, for both Lone Star and 'Incor'* *produced at each of the Lone Star mills.* Thus, every Lone Star division is able to furnish contractors, engineers and architects with highly useful information on the performance of its products. Another way in which Lone Star helps you get your money's worth in concrete.

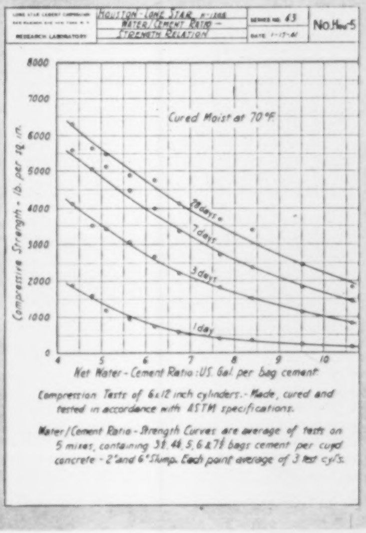
Test results have been summarized in convenient form, as shown by typical graphs, below.

*Reg. U. S. Pat. Off.

For Top Speed and Quality Concrete . . . Use Lone Star and 'Incor' Cements







LONE STAR CEMENT CORPORATION

Offices: ALBANY · BIRMINGHAM · BOSTON · CHICAGO · DALLAS · HOUSTON · INDIANAPOLIS · JACKSON, MISS.
KANSAS CITY · NEW ORLEANS · NEW YORK · NORFOLK · PHILADELPHIA · ST. LOUIS · WASHINGTON, D. C.

LONE STAR, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS . . 15 MODERN MILLS . . 25-MILLION BARRELS ANNUAL CAPACITY day; working hours were from 5 a.m. to 9 p.m., and best record was 3,100 ft in 15 hours; two pavers on subgrade laid first course, reinforcing mesh was then installed, and third paver alongside forms finished pavement; runways were ready six months ahead of schedule.

Airport Runways, Soil Cement. Soil-Cement for Army Airports and Runways, M. D. Catton. *Military Engr.*, vol. 34, no. 198, Apr. 1942, pp. 176–177. Article devoted to runway construction of many airports exclusively controlled by military authorities; use has been made of over 8,500,000 sq yd of soil cement to meet design problems presented at several of these airports.

Bank Protection. Seven Types of Bank Protection Used for Highway Along Santa Clara River, G. A. Tilton, Jr. *Calif. Highways & Pub. Works*, vol. 20, no. 5, May 1942, pp. 12–15. Discussion of following installations: 30-ft steel rail tetrahedron spur jetties; sacked concrete riprap revetment; portland cement concrete revetment; rock-and-wire mattress; steel rail and cable and rock-fill double fence; combination of sacked concrete riprap revetment and rock and wire toe mattress and combination of portland cement concrete revetment and rock and wire toe mattress.

Highway Engineering. Developments in Highway Construction, C. M. Hathaway. *Eng. & Contract. Rec.*, vol. 55, no. 23, June 10, 1942, pp. 19–22 and 26. Present-day earth-handling methods and secondary road construction techniques are considered to be two outstanding recent developments in highway engineering. Before Illinois Division of Highways.

Highway Systems, Alaska. Work Starts on Highway to Alaska, W. A. Averill. *Pacific Bldr. & Engr.*, vol. 48, no. 4, Apr. 1942, pp. 32–33 and 60. Notes on route and some difficulties to be encountered on Alaskan highway project, which is now under construction by American engineer troops.

Highway Systems, Canada. Crossing Canadian Bush, T. F. Francis. *Better Roads*, vol. 12, no. 4, Apr. 1942, pp. 15–18, 30, and 32. Last gap in Canada's important transcontinental highway route being closed; muskeg, rock, and difficulties of transport are being discussed.

Highway Systems, Pan-American. In Peace and War—Pan-American Highway Will Serve Western Hemisphere, C. Upham. *American Engr.*, vol. 12, no. 3, May-June 1942, pp. 11–12. Brief account of work that has been done as well as that which remains to be done on Pan-American Highway; value for military purposes, for transport of needed raw materials, and for exchange of commerce between United States and Latin-America.

Highway Systems, Pan-American. South America's Vital Road, S. A. McMillion. *Military Engr.*, vol. 34, no. 198, Apr. 1942, pp. 169–172. Pan-American highway, alternating routes, and connecting highways include all major portions of hard-surface roads on continent; system is becoming increasingly important in movement of strategic materials, development of closer bonds between neighboring republics, and speedy movement of defense forces from one part of continent to another in event of aggression.

Highway Systems, Panama. Trans-Isthmian Highway, Panama. *Engineering*, vol. 153, no. 3969, Feb. 6, 1942, pp. 101 and 102–103. Illustrated description of new road which is being constructed across Isthmus of Panama; length of whole road from Colon to Panama is $49^{1}/_{2}$ miles; new section will have total width of 10 ft, made up of two 10-ft reinforced-concrete lanes, separated by 4-ft strip of oil-treated gravel.

Pennsylvania. Reconstruction of Old Pavements on Heavily Traveled Highways, E. T. Baker. *Roads & Streets*, vol. 85, no. 6, June 1942, pp. 42–47, 50, and 53. Principal methods used, rather than detailed description, and some views of pavement sections adopted and results obtained will indicate character of effort employed to reconstruct old heavily traveled pavements.

Planning. Land Use Planning in Relation to Highways with Specific Reference to Delta County, Colorado, W. J. Keller. *Pub. Roads*, vol. 23, no. 1, Mar. 1942, pp. 5–13. As part of general program of land conservation and utilization, state and county committees have been appointed in every state to study problems confronting them intimately; report describes how this local committee approached problems and results of its studies.

Post-War Planning. Post War Highway Economics, C. M. Upham. *Boston Soc. Civ. Engrs.—J.*, vol. 29, no. 1 (Sec. 1), Jan. 1942, pp. 50–58. By 1944 one-half total labor force will be engaged in defense work or military forces; when hostilities cease workers will be shifted to peacetime activity, and author believes that planned program of highway construction would provide work for large number of persons unemployed.

Road Materials, Substitutes. To Replace Critical Materials. *Better Roads*, vol. 12, no. 6, June 1942, pp. 22–23. Substitutes for use in highway and bridge work listed as guide by War Production Board; selected items from list of suggested substitutes are given.

Roadside Improvement. Pennsylvania Turnpike and Its Landscape Treatment, R. W. Stewart. *Landscape Architecture*, vol. 32, no. 2, Jan. 1942, pp. 47–52 (discussion) 52–56. Problems involved in landscaping are: Clean-up of right of way; control of erosion; planting for snow control; planting to equalize wind pressure; revegetation; planting for seasonal effect and display; screening of undesirable views; and embellishment of constructional and maintenance structures.

Snow and Ice Control. Use of Salt for Icy Roads. *Pub. Cleansing*, vol. 32, no. 377, Jan. 1942, pp. 136 and 138. Mechanical removal vs. melting of ice discussed with particular attention drawn to present-day problems of machinery replacements; use of chemicals and their effect on surfacing.

Stabilization. Surface Consolidation and Maintenance with Calcium Chloride. *Calcium Chloride Assn.—Bul.*, no. 29, 1942, 58 pp. Highway development through maintenance; surface consolidation objectives; planning and preparation for surface consolidation; importance of binder-soil; essentials in mixing and placing operations; use of calcium chloride; stabilizing effects; maintenance and resurfacing; airport runways.

SANITARY ENGINEERING

Emergency Provisions. Emergency Provisions for Water Supply and Sanitation, E. A. Hepburn. *Commonwealth Engr.*, vol. 29, no. 10, May 1, 1942, pp. 247–248. Paper deals with sanitation problems arising in connection with evacuation of residents of thickly populated metropolitan and other areas to inland districts; only practical disinfectant is chlorine; preparation of doses for water treatment; hypochlorite of soda solution for small townships; precautions because of corrosive nature of chlorine; sewage disposal. Abstract from paper in *Health Bulletin*, Nos. 67–68.

SEWERAGE AND SEWAGE DISPOSAL

Camps, Military. Sanitation in Design of Army Camp, W. E. Stanley. *Cornell Engr.*, vol. 7, no. 4, Jan. 1942, pp. 10–11 and 22. Discussion of sanitary facilities required for army camps: Facilities for water supply, treatment, storage, and distribution; sewerage and sewage disposal; garbage and rubbish collection and disposal; grease traps, including shower baths; central toilets and urinals; washing facilities; laundries; heating and ventilation; surface and storm water drainage; mosquito control; and recreational activities.

Disposal Plants, Arlington, Va. Sewage Treatment for New War Department Office Building, C. R. Velzy. *Sewage Works Eng. & Mun. Sanitation*, vol. 13, no. 6, June 1942, pp. 286–288. Description of sewage-treatment plant being constructed to meet needs of large office building block in Arlington, Va.; since location of plant is in immediate vicinity of office block, nuisance-free operation is essential; basic design; grease removal; sludge digestion; sludge handling.

Disposal Plants, Philippine Islands. Activated Sludge Plants in Philippines, M. Manosa. *Philippine Eng. Rec.*, vol. 6, no. 3, Third Quarter 1941, pp. 9–15 and 27. First activated sludge plant in Philippines was small experimental plant at Baguio, city with population of about 25,000; details of experimental plant, at site in Barrio Lucban bordering Trinidad River; description of Quezon Institute plant in Quezon City (2 km northeast of Manila), designed for maximum daily capacity of 200,000 gal without sludge-drying beds; cost about 40,000 pesos, Philippine currency; operation of plant.

Filtration. Sewage Filtration, J. Hurley. *Surveyor*, vol. 101, no. 2624, May 8, 1942, pp. 157–158. Report on investigations aimed at increasing general efficiency of biological filtration process. Discussion includes: High-rate operation of single-stage open filters; processes involving recirculation of filter effluent; operation of filters in series; and enclosed aerated filters. Before Inst. Sewage Purification.

Gas Recovery. How New York Is Meeting Its Sewage-Treatment Problem. *American City*, vol. 57, no. 4, Apr. 1942, pp. 73–74 and 95. Practical use of digested gas and resourceful design of settling tanks are among features of Bowery Bay Plant now in full operation.

Sewage Filters. Accelo-Filter, H. W. Gilland. *Civ. Eng.* (London), vol. 37, no. 428, Feb. 1942, pp. 37–40. Advantages of this method described and discussed as follows: Savings in initial investment, odor nuisances largely eliminated, continous operation abates fly nuisance, clogging eliminated, settled sewage continuously inoculated with aerobic life, circulating material continuously reactivated by aeration; filtration materials analyzed; experience at Columbia, S.C., described.

Sewers, Construction. Jacking Sewer Under Railroad, W. S. Harvey. *Eng. News-Rec.*, vol. 129, no. 1, July 2, 1942, pp. 22–24. To extend 54-in. sewer under five railroad tracks at Warren, Ohio, 148 ft of concrete pipe was jacked into place; pipe was made in 4-ft sections, first piece of which was equipped with manganese steel cutting shield; two 100-ton hydraulic jacks were used and rate of advancement was 9 in. per hour; saving resulting from use of jacking method is estimated at $15.24 per lin ft.

STRUCTURAL ENGINEERING

Beams, Concrete. Design of Doubly Reinforced Beams and Tests on Construction Joints, E. G. S. Powell. *Structural Engr.*, vol. 20, no. 2, Feb. 1942, pp. 13–19. Method set out was derived by author some years ago for his own use in order to speed up design of doubly reinforced beams and to take away much of tedium; it is quick, accurate, and direct method and does not involve approximations.

Beams, Deflection. Deflection of Beams Under Simultaneous Axial and Transverse Loads, A. G. Strandhagen. *Product Eng.*, vol. 13, no. 7, July 1942, pp. 396–398. Method for quickly obtaining solutions of differential equations involved in determining flexure of beams subjected to axial loading as well as transverse loading; method is based on use of Laplace transformation.

Floors, Concrete. Steel Saved by Using Wire to Reinforce Pre-Cast Concrete Joists on Los Angeles Housing Projects. *Construction Methods*, vol. 24, no. 6, June 1942, pp. 47–49, 84, and 86. Savings in steel to meet war-time demands are accomplished by new concrete floor design applied to three mass housing projects in Los Angeles, Calif.; features of design are elimination of steel bar reinforcement and use of wire fabric in floor slabs and cold drawn wire in pre-cast concrete joists.

Roof Trusses. Tubing Saves Steel in Long Trusses, H. S. Card. *Eng. News-Rec.*, vol. 129, no. 1, July 2, 1942, pp. 37–39. Use of tubing for web members of steel trusses is recommended; design incorporating this substitution is presented for hangar roof truss of $121^{1}/_{2}$-ft span; total weight of new design is compared with that of riveted trusses actually built; weight savings made possible by use of tubing for web members of all welded design for same load requirements; comparison of total costs for various truss designs is given in tabular form.

Roofs, Concrete. Monolithic Concrete Barrel—Roof Design for U.S. Navy Supply Depot. *Concrete*, vol. 50, no. 5, May 1942, pp. 5–6. Cylindrical dome roofs carry design load of 80 lb per sq ft by direct stress, to transverse frames without exceeding stress of 200 lb per sq in. on shell $3^{3}/_{4}$ in. thick; three-dimensional carrying action of these domes is particularly suitable against bomb attack; construction procedure.

Structural Design, Light-Weight Construction. Design for Thin Walled Sections, E. J. W. Ragsdale. *Boston Soc. Civ. Engrs.—J.*, vol. 29, no. 2, Apr. 1942, pp. 110–119. Stability considered as governing factor in light-weight design; various currently used structural materials are evaluated with reference to their stability, and comparisons are made.

Trusses, Deflection. Deflection of Trusses, R. P. V. Marquardsen. *Western Soc. Engrs.—J.*, vol. 47, no. 1, Feb. 1942, pp. 35–40. Short practical method for determining deflections and panel-point movements of trusses; method is partly analytical and partly graphical.

Walls, Brick. Construction of Hollow Brick Walls. *Eng. & Contract. Rec.*, vol. 55, no. 22, June 3, 1942, pp. 18–19. Numerous economies in labor and materials are possible with various types of hollow brick walls; air space has dampproofing and insulating value.

Walls, Cracks. Prevention of Cracking, E. W. Dienhart. *Concrete*, vol. 50, no. 5, May 1942, pp. 24–27. It is shown that a number of steps can be taken to reduce wall shrinkage with view toward preventing wall cracking; footings and foundations; bonding and typing; wall openings; concentrated loads; mortar and workmanship; volume changes due to temperature and moisture content; design of unit affects walls cracking; wall reinforcement.

Welded Steel Structures. Welded Structures, G. Johansson. *Product Eng.*, vol. 13, no. 7, July 1942, pp. 390–391. Author points out some of unfavorable conditions caused by lack of fixed yardstick or rule governing welding of structures; unexpected misfits and defects that develop during welding can largely be eliminated by proper foresight in engineering department; number of specifications to be noted on design drawings are suggested.

Wooden Construction. Modern Timber Construction, L. P. Keith. *Eng. & Contract. Rec.*, vol. 55, no. 24, June 17, 1942, pp. 16–18. Characteristics of timber construction presented with reference to adaptability, stress resistance, and economy; connector constructions; joints in timber trusses; future trends.

Wooden Construction. Timber Takes Its Place in Construction, H. C. Berckes. *Mfrs. Rec.*, vol. 111, no. 6, June 1942, pp. 24–25 and 54. Review of uses of lumber as substitute for steel and other metal.

TRAFFIC CONTROL

Highway Traffic Signs, Signals, and Markings. Surface-Dressed Traffic Lines. *Surveyor*, vol. 101, no. 2630, June 19, 1942, pp. 207–209. Report of investigations conducted by Road Research Laboratory in Great Britain on alternate methods of producing white lines; use of surface-

We'll gladly fiddle when
Tokyo and Berlin burn...

DIXON'S TYPHONITE ELDORADO — HB

but not now!

You can bet your bottom dollar we'll join in the celebration of the defeat of the Axis. For just as surely as good triumphs over evil, that day is coming! Meanwhile, there's work to be done! The biggest rush job, in fact, America ever tackled.

Like many unsung implements of war, *Typhonite* ELDORADO is playing a major role! Because the blueprints of Victory must be unmistakably clear, 100% correct. Eldorado's incredibly smooth lines, uniform degrees, dustless, stronger points and greater visibility give better performance. Its controlled leads and greater adaptability give it the dependable speed necessary for today's demands.

ELDORADO

Pencil Sales Department, 38-J10, JOSEPH DIXON CRUCIBLE COMPANY, Jersey City, N. J.

HOW TO BE SURE

NATURE'S AIR RAIDS

WON'T INTERFERE WITH VITAL WAR PRODUCTION!

★ ★ ★ ADEQUATE protection of vital war production against delays or shutdowns due to accident or sabotage is an important consideration today. The hazards of lightning should not be overlooked. Lightning is Nature's method of making an air raid, can act like either an incendiary bomb or a demolition bomb. Yet West Dodd can provide security easily and at reasonable cost.

West Dodd Lightning Protection and static control installations are widely used on Army Ordnance Plants. They are helping safeguard ammunition loading lines, standard magazines, underground magazines and bag loading buildings. Many important industrial plants have equipped their power stacks with West Dodd Protection.

WEST DODD RELIABILITY

West Dodd represents a consolidation of the 12 old line manufacturers of lightning protection. Including the famous Dodd & Struthers Company, pioneer of modern lightning protection equipment and certified methods of installation. This wealth of experience in designing, building and installing lightning protection, plus a long-proved record of responsibility, are plus factors in choosing West Dodd for the job.

For Further Details Write or Wire

TELEPHONE OR TELEGRAPH TODAY!

WEST DODD
LIGHTNING CONDUCTOR CORP.
GOSHEN, INDIANA

dressed lines consisting of white or light colored chippings held to road surface by tar or bitumen

INTERSECTIONS. Solution to Traffic Congestion, L. L. Williams. *Cornell Engr.*, vol. 7, no. 6, Mar. 1942, pp. 9–20, and 22. Illustrated description of portable street overpass which allows unobstructed through traffic and sufficient clearance for right or left turn at intersection without interference of overhead traffic.

TUNNELS

BOSTON, MASS. Hydraulics of New Pressure Aqueduct of Metropolitan Water District, K. R. Kennison. *Boston Soc. Civ. Engrs.—J.*, vol. 29, no. 1, (Sec. 1), Jan. 1942, pp. 1–21. Eliminates various sources of pollution by making it possible to use only best sources; gives additional carrying capacity of supply mains which feed district from terminal of Western Aqueduct; extensions will eliminate necessity of pumping at Chestnut Hill; and since loop was designed as part of distribution tunnel, it will ultimately eliminate pumping from Spot Pond station to Falls Reservoir.

ENGLISH CHANNEL. Channel Tunnel, W. Ley. *Military Engr.*, vol. 34, no. 199, May 1942, pp. 224–227. Review of history of plans for construction of cross-channel tunnel, which were waived for purely political reasons, with some notes on present strategic qualities of such project; more recent plans include bridge or twin dam protected canal which would provide for shipping under adverse weather conditions and eliminate objection raised by Britain that tunnel would discourage channel commerce.

SEWER TUNNELS, CONSTRUCTION. Terre Haute Constructs Sewer by Tunneling to Avoid Inconvenience to Public, R. E. Gibbons. *Pub. Works*, vol. 73, no. 6, June 1942, pp. 15–16 and 65. Construction methods employed in tunneling 1 mile of 96-in. sewer 28 to 42 ft deep in important street, at cost less than that estimated for open trenching.

WATER SUPPLY, NEW YORK. Delaware Aqueduct, F. G. Switzer. *Cornell Engr.*, vol. 7, no. 6, Mar. 1942, pp. 7–8 and 20. Brief review of legal procedures in obtaining water rights preliminary to construction of aqueduct; general details of construction planned and physical features of tunnel.

WATER SUPPLY, NEW YORK. Developing Neversink Watershed, T. L. Wells. *Explosives Engr.*, vol. 20, no. 6, June 1942, pp. 166–174. Notes on diversion tunnel and other work on contract of G. M. Brewster & Son, for second reservoir unit of Delaware Water Supply System; general purposes of project, of which diversion tunnel is major item; inlet and outlet channels, cofferdam.

WATER PIPE LINES

SUBAQUEOUS. Laying Submarine Pipe in Portland Harbor in Winter, H. U. Fuller. *New England Water Works Assn.—J.*, vol. 56, no. 1, Mar. 1942, pp. 65–69. Steel pipe with two lugs welded to each end of 40-ft lengths was purchased; pipe was centrifugally lined inside and coated and wrapped on outside; method of construction and equipment employed, described.

WATER RESOURCES

CONSERVATION. Water Conservation in New Hampshire, R. S. Holmgren. *New England Water Works Assn.—J.*, vol. 56, no. 1, Mar. 1942, pp. 1–7. Discussion of conservation of water in lakes for recreational use, and conservation in reservoirs for river regulation and generation of power.

WAR TIME. Water and War, G. E. Symons. *Water & Sewage*, vol. 80, no. 6, June 1942, pp. 22–24 and 129. Various emergency methods for meeting emergency demands are described; temporary reservoirs; individual and portable water treatment equipment; water-works protection; decontamination.

WATER WELLS, DEEP. Deep Wells as Source of Water Supply in Province of Ontario, A. T. Byram. *Water & Sewage*, vol. 80, no. 6, June 1942, pp. 13–16. Deep-well supply considered superior to surface water in that pumping charges are major portion of cost of operation and ground water usually has lower temperature and is more palatable than surface supply; 84 of 288 municipal water works in Ontario depend upon deep wells for supply.

WATER TREATMENT

CAMPS, MILITARY. Experimental Treatment of Rancocas Creek Water for Fort Dix, N.J., R. D. Mitchell. *New England Water Works Assn.—J.*, vol. 56, no. 1, Mar. 1942, pp. 76–83. Discussion confined to treatment of surface water supply; experiments demonstrated that for water in question, lime alum treatment was considerably lower in cost than any of others investigated; economy of treatment thus makes it desirable to exert considerable effort to obtain sufficiently precise feeding mechanisms to operate at optimum lime alum ratio.

CHLORINATION. Restoring Well Capacity With Chlorine, E. D. Brown. *Am. Water Works Assn.—J.*, vol. 34, no. 5, May 1942, pp. 698–702. Experiences of city of Eau Claire, Wis.; results of two separate treatments by this method are shown

TANK CARS ARE VITAL TO VICTORY...

"KEEP THEM ROLLING"

...AND SPEED YOUR OWN ASPHALT DELIVERIES, TOO!

● Today, unprecedented quantities of bituminous materials are urgently needed for defense highways, airports and access roads. Tank cars for asphalt deliveries are vitally important. How can these increased demands be met with the limited supply of cars available?

You can help answer that—and speed your own asphalt deliveries, as well. Keep your tank cars rolling. There are four simple ways suggested here. The Standard Oil Asphalt representative in your locality will work with you in developing plans to meet this emergency. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the representative nearest your job.

OIL IS AMMUNITION — USE IT WISELY

4 ways you can help keep tank cars rolling

1. Accurately estimate your asphalt needs when placing yearly contracts. An extremely high estimate may force your supplier to hold large stocks and delivery facilities open which others might need.

2. Carefully plan delivery schedules, as far in advance as possible, so that your supplier and your railroad can be sure that transportation is available when you want it.

3. Speed up unloading by scheduling deliveries when your crews and equipment are available.

4. Release empty cars.

Copyright 1942, Standard Oil Company (Ind.)

ASPHALT FOR EVERY PURPOSE

STANDARD OIL COMPANY
(INDIANA)

WHEN SHORTAGES BRING YOU TO A DEAD END . . .

VITAL EMERGENCY CONSTRUCTION
PARTITIONS-FAST
BUILT-UP ROOF-QUICK
EXTERIOR WALLS-NOW
FACTORY FLOORS-SOON
OFFICE & FACTORY SOUND QUIETING-AT ONCE
DEAD END
MATERIAL SHORTAGE

Let New Celotex Building Products Help You Find a Practical Way Around!

THE VICTORY program must not be halted. Countless military and industrial construction projects are being rushed to completion. But, just at the crucial moment, delay is often threatened by a shortage of some critical material. An A-1-a Priority doesn't do any good if there is none of that material to be had!

If your project has a high priority rating, there is often a practical way around such "dead ends"—by using Celotex Building Products, many of which have been specially developed to replace critical materials. Insulating exterior walls—partitions—shock-absorbing floors—built-up roofs and roof insulation—sound-conditioning for office and factory—these are a few of the needs Celotex Products can help you meet *immediately!*

Countless vital victory projects are moving ahead, *around the "dead end,"* because of the availability of dependable products provided by many Celotex plants working at full capacity. Write for your copy of our new Industrial Catalog No. 10—and see how many of *your* urgent demands are met by Celotex Products!

CELOTEX
REG. U. S. PAT. OFF.
BUILDING PRODUCTS

The word Celotex is a brand name identifying a group of products marketed by The Celotex Corporation.

THE CELOTEX CORPORATION • CHICAGO

in table, and details of application for each well in accompanying tabulation of well logs; that procedure is both effective and economical technique for reclaiming well capacity is clearly demonstrated.

FILTRATION PLANTS, CHICAGO. Conception, Design, and Construction of South District Filtration Project. *Eng. News Rec.*, vol. 128, no. 25, June 18, 1942, pp. 995–998, supp. sheets pp. 1020-1023. Analysis of function, structural features, and equipment installation for world's largest water-treatment plant now nearing completion at Chicago; design; problems and solution, hydraulic functions, structural arrangements, architectural treatment; lifting water from lake; conditioning water; filter design features; chemical handling facilities; instruments for operating control; flow diagram.

IRON REMOVAL. Experiences of Sanford Water District in Water Treatment, H. L. Clark. *New England Water Works Assn.—J.*, vol. 56, no. 1, Mar. 1942, pp. 59–63 (discussion) 63–64. Town is located in southwestern Maine; population 15,000; many complaints about rusty water were received; after considerable study, writer recommended installation of zeolite iron removal plant; decided improvement in quality of water was evident immediately after plant was put in operation.

RESERVOIRS, ALGAE CONTROL. Carbon "Blackout" for Preventing Algae Growths in Reservoirs, H. O. Hartung and V. C. Lischer. *Water & Sewage*, vol. 80, no. 5, May 1942, pp. 20 and 37. Purpose of activated carbon fed into water is to exclude sunshine which is essential to growth of algae; carbon feeding technique; practice of St. Louis County (Missouri) Water Co. cited.

WATER POLLUTION, CANADA. Relation of Disposal of Sewage and Water Purity, N. J. Howard. *Water & Sewage*, vol. 80, no. 6, June 1942, pp. 21 and 126–128. Report submitted to Board of Control of Toronto with reference to pumping of sludge into lake waters and its effect on raw water supply; while report was prepared with particular set of conditions involved, it has general application to all situations where disposal of sewage constitutes water supply problem; conclusion is drawn that new sewage disposal system is only remedy.

WATER WORKS ENGINEERING

AIR-RAID PRECAUTIONS. Air-Raid Organization Measures for Water Supply Protection. *Eng. News-Rec.*, vol. 128, no. 25, June 18, 1942, pp. 990–993. Plans for protection and repair of public works in case of air raids and sabotage have been carefully developed by Chicago's bureau of engineering; one of most important procedures outlined is that dealing with emergency protective measures for city's water supply; description of organization, personnel, duties, and equipment of water safety units that have been established.

BOMBING EFFECT. Some Physical Effects of Bombing, H. G. Baity. *Am. Water Works Assn.—J.*, vol. 34, no. 4, Apr. 1942, pp. 513–522. Restatement of certain data long ago developed by ordnance experts, proved in theaters of war during last two world-wide cataclysms, and currently appearing in many popular and technical journals; anatomy and trajectory of bombs; channels of destruction of high explosive bombs; vulnerability of various types of construction; probability of bomb hits on vital structures.

CHEMICAL WARFARE. Chemical Poisoning of Municipal Water Supplies, H. M. Taylor. *American City*, vol. 57, no. 5, May 1942, pp. 46–47. Thorough water analysis and careful guarding of water systems should give ample protection against danger; decontamination; testing procedures.

PROTECTION. State of Washington Plans Water Works Defense. *American City*, vol. 57, no. 3, Mar. 1942, pp. 40–41. Observations on part water works play in total war effort; review of bulletins issued by Washington State Dept. of Health in order to make certain that water works departments in that state will efficiently meet any and all requirements placed on them by sabotage or air attack.

TANKS AND TOWERS. Care and Maintenance of Elevated Steel Tanks, E. E. Alt. *Water & Sewage*, vol. 80, no. 5, May 1942, pp. 18–19 and 38–41. Cleaning and painting considered as fundamentals of tank maintenance; painting procedure and schedules.

WAR-TIME. Maintenance and Operation of Water Works in War Time, W. A. Averill. *Pacific Bldr. & Engr.*, vol. 48, no. 6, June 1942, pp. 46–48, 50, 52, 54, and 56. Outline of methods for preventing sabotage, repairing war damage, cooperation with Office of Civilian Defense, auxiliary water supplies, conservation of critical materials, value of civilian guards, and mutual aid plans.

WELLS, ROCK. Experiences in Developing Rock Wells, J. A. Carr. *Am. Water Works Assn.—J.*, vol. 34, no. 5, May 1942, pp. 691–694. Author's experience has convinced him that yield of many rock wells, at least in red sandstone formation of northern New Jersey, can definitely be increased by agitation.

* This illustration shows the "Ring Test" to determine the modulus of rupture. A ring cut from the pipe is subjected to progressively increased crushing load until failure occurs. Although not a required acceptance test, it is one of the additional tests regularly made by this Company to further check and maintain the quality of its pipe so that it will adequately meet severe service requirements. *United States Pipe and Foundry Co., General Offices: Burlington, New Jersey.* Sales Offices in Principal Cities.

*** One of a series of controls in operation at each of our plants, beginning with inspection and analysis of raw materials and ending with tests of the finished product, all subject to the central control of our headquarters staff at Burlington.**

U.S.
cast iron
PIPE

Centrifugally or Pit Cast for
water, gas, sewerage, drainage
and industrial services.

"General Grants"---

THEY'RE TOUGH, FAST AND HARD HITTERS!

Challenged by an aggressive enemy with years of war machine building experience, American engineers, in record time, designed, tested and built the famed "General Grant" tanks. Heavily gunned, tough and fast in the field, these steel monsters can out-fight, out-shoot and out-maneuver anything the Axis powers have yet rolled out.

But it takes water to build tanks—water for the men who work in the plants—for those who produce the steel for those who operate and service them—and for millions of other people in the Service of Supply. Before plants could be built, armies trained and munitions made, there had to be an abundance of water. Upon the old, reliable and capable shoulders of the Layne Organization fell much of the task of producing that water. Layne swung into action and in record time, built deep well water systems by the hundreds, thus making possible unprecedented war and production programs.

Layne's reputation like that of the "General Grant" tanks, has been won on the field of action. Layne wells and pumps are doing an outstanding job—operating day and night, producing millions and millions of gallons of water for almost every phase of America's war effort. For late bulletins, wire or write LAYNE & BOWLER, INC., Memphis, Tenn.

LAYNE
PUMPS & WELL
WATER SYSTEMS

Affiliated Companies

Layne-Arkansas Company	Stuttgart, Ark.
Layne-Atlantic Company	Norfolk, Va.
Layne-Bowler New England Corp.	Boston, Mass.
Layne-Central Company	Memphis, Tenn.
Layne-Northern Company	Mishawaka, Ind.
Layne-Louisiana Company	Lake Charles, La.
Louisiana Well Company	Monroe, La.
Layne-New York Company	New York City
Layne-Northwest Company	Milwaukee, Wis.
Layne-Ohio Company	Columbus, Ohio
Layne-Texas Company	Houston, Texas.
Layne-Western Company	Kansas City, Mo.
Layne-Western Co. of Minn.	Minneapolis, Minn.
International Water Supply, Ltd.	London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

Equipment, Materials, and Methods

New Developments of Interest, as Reported by Manufacturers

Welding Transformers

A NEW LINE OF HEAVY-DUTY alternating-current welding transformers especially designed for Unionmelt welding has been announced by the General Electric Co., Schenectady, N.Y. The welders are available in 750- and 1000-ampere sizes (NEMA) for 220-, 440-, and 550-volt power.

Features of the line are built-in capacitors and built-in primary control. The capacitors are valuable for improving voltage regulation of the power feeders, thus aiding uniform welding. The built-in primary control not only simplifies wiring, but is advantageous in portable installations because of its compactness. It includes a disconnecting switch and auxiliary transformer to furnish power for operation of Unionmelt auxiliaries.

Motor-operated, remote adjustment of the welding current permits an operator to make current adjustments without leaving the work. The equipment's integral reactance design permits full output to be obtained without the use of high or multiple open-circuit taps. The current output of each welding transformer is indicated by a large, accurately calibrated scale on the front of the case.

Fan cooling conserves vital materials and space. Ample ventilation and the arrangement of ducts permits two welders to be mounted side by side without the need for extra space between them for ventilating air.

New Asphalt Siding

CORRUGATED ASPHALT SIDING, a new, non-critical building material, has been developed by Certain-teed Products Corp., 120 S. La Salle St., Chicago, Ill. The siding is designed for use in outside walls of temporary structures of all kinds, including factory buildings, warehouses, storage and machine sheds, or any buildings where corrugated metal siding might normally be used.

The new material has a number of unique features. It consists of two layers of heavy rag felt, each saturated in a resinobituminous compound, bound together with a layer of high-melting-point asphalt, and corrugated under high pressure. The resulting product is strong, light weight, moisture-proof and durable. It is stated that the corrugations will not flatten out during summer weather, either in storage or after application.

Certain-teed corrugated asphalt siding weighs approximately 12 oz to the sq ft, and individual sheets are easily handled or applied by one man. The sheets are 28 in. wide, in lengths of 6, 7, 8, 9, and 10 ft. The siding is fastened with ordinary roofing nails placed in the valleys of the corrugations. Its life can be indefinitely prolonged, according to the manufactures, by painting with asbestos roof coating.

New Asbestos-Faced Board

A NEW BOARD OF laminated construction is announced as A-D Board by The Philip Carey Manufacturing Co., Lockland, Cincinnati, Ohio.

This board is finished in white asbestos felt on both sides, is attractive in appearance itself, and readily takes casein, cold water, or lead and oil paints. It is reported to be rust-proof, moisture-resistant, flame-proof, a non-conductor, strong, light, tough, and easily worked. Since it is free from asphalt or organic binder, it has many industrial applications. The board is available in sheets 33 by 60 in.

Handbook on Plywood

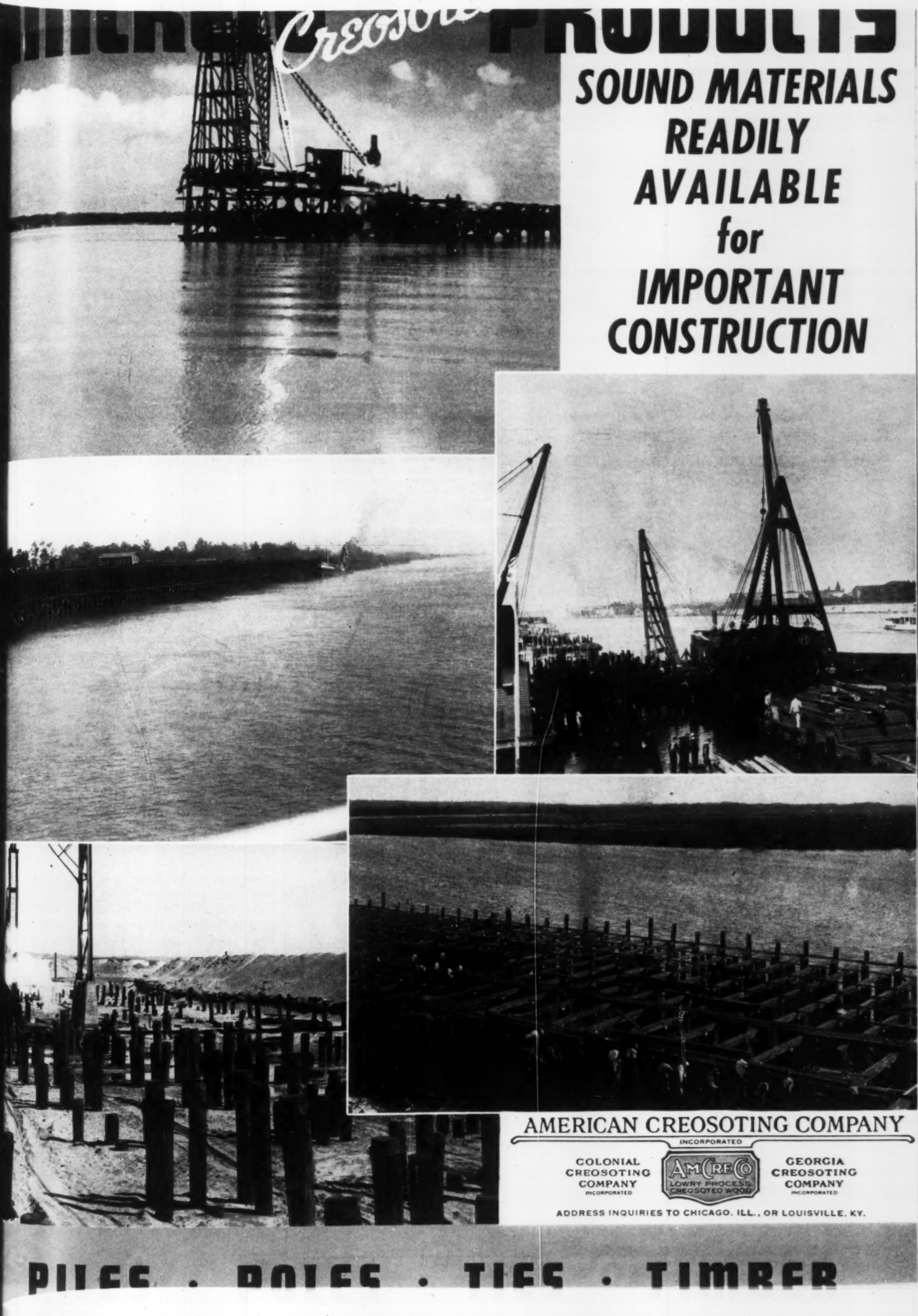
TECHNICAL DATA ON PLYWOOD, sought by engineers today, are presented in a new loose-leaf handbook offered free by Douglas Fir Plywood Association, Tacoma, Wash.

The technical book, edited by N. S. Perkins, chief engineer of Douglas Fir Plywood Association, carries three sections: physical properties of fir plywood, designing with plywood, and prevention of condensation in walls. Included is a table—established by U. S. Forest Products Laboratory engineers—of approximate methods for calculating the strength of plywood. Other tables, charts and diagrams relating to strength properties under tension, compressure, flexure and shear, supplement the text. A table of moments of inertia is given. Two other sections treating with deflection and insulation properties of plywood are being printed.

New Welding Electrode

A NEW ELECTRODE DESIGNED specifically for all-position welding of mild steel with A-C type welding machines has been developed by Wilson Welder and Metals Co., Inc., in the following diameters: $^1/_{16}$ in., $^3/_{32}$ in., $^1/_8$ in., and $^5/_{32}$ in. Made to fill a rapidly growing need for a high quality A-C electrode for all-position use, the Wilson No. 530 electrode complies with all requirements of the American Welding Society Classification E6011, American Bureau of Shipping, Group H1G and B1G for A-C and other specifications qualifying it for use on war work.

It is claimed that results of physical tests demonstrate that this electrode is superior to preceding all-position A-C electrodes and that the high quality of deposited metal of the No. 530 is fully comparable to that of the best D-C reverse polarity all-position electrodes. Physical test results made on all-weld-metal tensile specimens show Ultimate Tensile Strength of 70,000–75,000 lbs, as welded and 65,000–70,000 lbs, stress relieved—Percent Elongation in 2 in. of 25–30% as welded and 30–35%, stress relieved.



Creoso PRODUCTS

**SOUND MATERIALS
READILY
AVAILABLE
for
IMPORTANT
CONSTRUCTION**

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL
CREOSOTING
COMPANY
INCORPORATED

AmCreCo
LOWRY PROCESS
CREOSOTED WOOD

GEORGIA
CREOSOTING
COMPANY
INCORPORATED

ADDRESS INQUIRIES TO CHICAGO, ILL., OR LOUISVILLE, KY.

PILES · POLES · TIES · TIMBER

RITECURE
THE ORIGINAL COLORLESS MEMBRANE
FOR AIRPORT CONSTRUCTION

In Curing Concrete it's the Film that Counts

It's the RITECURE Film with 60% solids that Counts Most

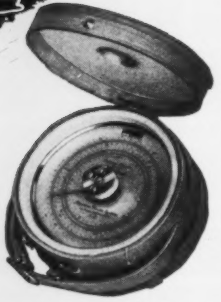
RITECURE was the film-forming curing agent used on such important concrete surfaces as the Tri-borough and Bronx-Whitestone Bridges. Censorship prohibits publication of the numerous airports, access roads, military highways and government buildings in every part of the country on which RITECURE was the standard curing medium.

Yes, RITECURE has a long record . . . a record of helping contractors to produce better concrete structures economically. It is the ideal curing material for airport construction where speed is essential. It reacts with the calcium radical in the concrete, not only to form the impervious, semi-elastic, moisture-sealing membrane but to hard-surface the concrete. RITECURE increases the abrasion resistance and durability of concrete surfaces.

RITECURE is economical to use and easy to apply. One gallon will cover from 30 to 40 square yards with tough, lasting, impervious membrane which effectively seals in the moisture during the entire critical curing period. By test, it show 97.4% water retention for 24 hours, 96.2% for 72 hours, and 92.4% for 168 hours. It's the 60% solids that count.

• *RITECURE is furnished with a temporary color indicator to aid application and inspection.*

THE JOHNSON-MARCH CORPORATION
52 Vanderbilt Avenue, New York, N. Y.
RITECURE is sold by:
THOMPSON MATERIALS CO. New York, N. Y. • Belleville, N. J.
CURING MATERIALS CO. Pittsburgh, Pa. • Norfolk, Va. • Atlanta, Ga.
10-JM-1



Speed-Up ALL FIELD SURVEYS!

Preliminary surveys for highway construction, drainage and irrigation systems, dams, water lines, all divisions of civil engineering are speeded up by the *NEW* Paulin Precision Surveying Aneroid. Readings to two feet over a range of 4500 feet are as easy as reading a watch. Other models cover a range of **18,000** feet. Write for complete literature and FREE COPY of the *Paulin Altimetry Manual.*

AMERICAN PAULIN SYSTEM
1847 SOUTH FLOWER STREET
LOS ANGELES, CALIFORNIA

AMERICAN SOCIETY OF CIVIL ENGINEERS FOUNDED 1852

Why do so many ENGINEERS ask for all 24 of the ASCE MANUALS?

These Manuals of Engineering Practice, compiled by men of wide experience and acknowledged authority, contain information useful to the civil engineer in his every-day work. They present facts, briefly and to the point, and should be of value to you. You can get the list of Manuals published to date by mailing the coupon.

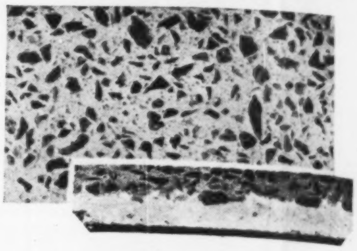
American Society of Civil Engineers
33 West 39th Street, New York, N.Y.

Please send, without obligation, complete list of 24 Am. Soc. C.E. Manuals.

Name ....
Address ....
City .... State ....

New Non-Slip Flooring

TO PRODUCE non-skid floors, either wet or dry, Walter Maguire Co., Inc., New York, N.Y., are offering Cortland Emery Aggregate, a mixture of scientifically graded large and small, sharp, hard particles of mineral emery. For application, the Cortland Emery Aggregate is



mixed with Portland cement and water to produce a floor topping which provides a firm non-slip gripping surface. In addition, it is claimed, this flooring increases the load-bearing qualities, for a Cortland Emery Aggregate floor mixture specimen will support a load of more than 14,000 lb. Heavy trucks will not destroy the Cortland Emery Aggregate surface and the hardness of the emery particles resists wear. For further details write to the manufacturer at 330 W. 42nd St., New York City.

Wood Sash

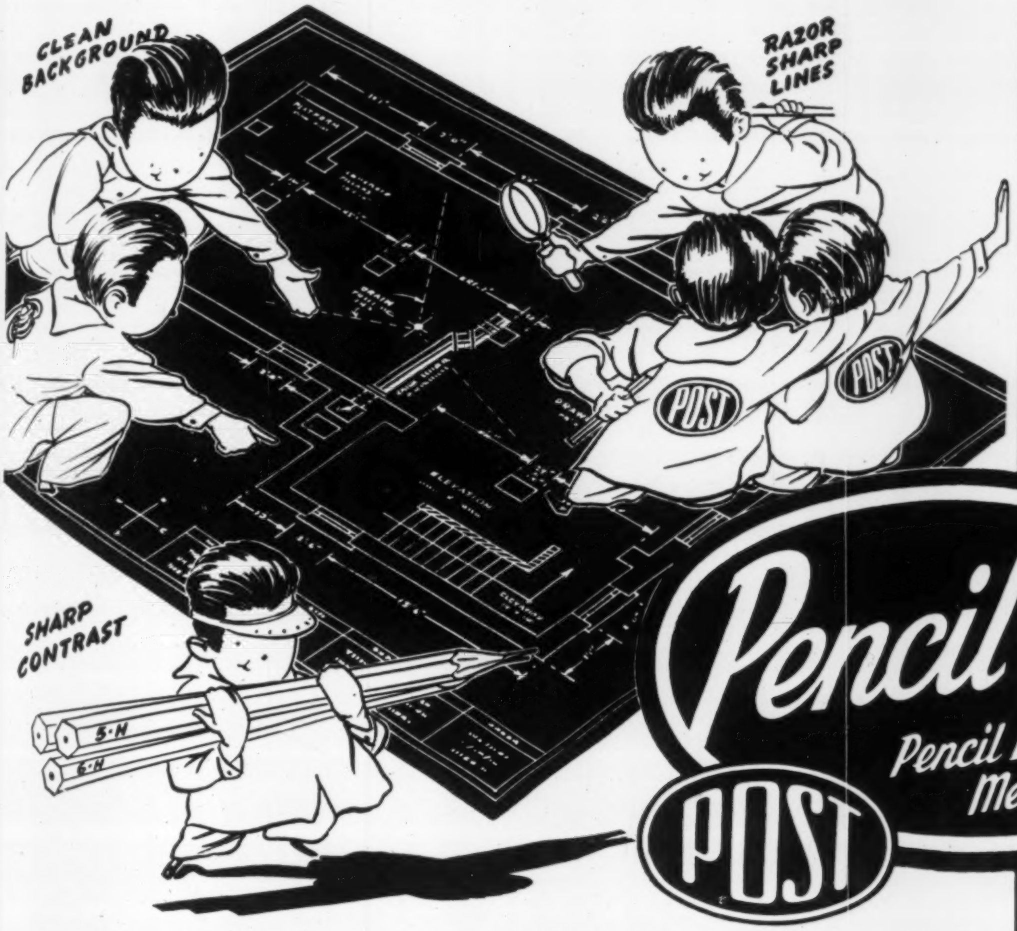
THE NATIONAL DOOR MANUFACTURERS ASSOCIATION has announced the development of National Wood Sash, in eighteen standard basic units, each basic unit an opening in itself.

The units may be installed individually or the various units may be combined, in height and width, to meet almost every installation requirement in industrial and commercial buildings, schools, hospitals, etc., and in any type of wall construction. The standardized frame is designed to accommodate either bottom-pivoted in-projecting vents or top-pivoted out-projecting vents without modification or change in the hardware requirements. Streamlined in every detail, these units provide a maximum of light area per opening; the operating hardware is friction controlled and is claimed to hold the ventilator in any desired open position without danger of banging or slamming with resultant glass breakage. Hardware for one complete unit weighs only about three pounds, thus conserving critical metals.

Frames are completely factory fitted and all sash pre-fitted to exact size for quick installation. All parts are treated with a toxic preservative to add to their durability. The ventilators being of the projected type, screening or storm sash may be easily installed, and windows washed easily and safely from the inside.

The sash will be manufactured by members of the Association, as well as other mills, in every section of the country. Manual A, containing complete information, with specifications and detail drawings, will be mailed free on request to National Door Manufacturers Association, Inc., 322 South Michigan Ave., Chicago, Ill.

PRINTS ARE KEENER



Pencil-TEX
Pencil Drafting Medium
POST

HARD PENCIL LINES PRINT CLEAN AND CLEAR

Men who work from prints appreciate the unique qualities of *Pencil*-TEX as much as the draftsmen who work with it. For prints made from hard pencil tracings on *Pencil*-TEX are *GOOD.* From *Pencil*-TEX originals, made in one operation, the prints are characteristically clean, clear and sharply defined. In the glass-like transparency of the new microscopically smooth surface of *Pencil*-TEX lies the secret which results in the keener prints from *Pencil*-TEX originals. And pencil drawings, of the quality rendered by *Pencil*-TEX, save valuable time *now* when time is of the essence. *Pencil*-TEX, in 20 yard rolls of 30, 36 and 42-inch widths, is available for immediate delivery with Priority of A2 or better. Post wants you to try *Pencil*-TEX at their expense because they know once you have experienced *Pencil*-TEX satisfaction, you will use it — always!

PHONE POST AND PEP-UP PRODUCTION

GET YOUR FREE TRIAL NOW

At our expense, prove to yourself the superiority of *Pencil*-TEX. Free trial samples—actual work size sheets—are yours for the asking. At the right is the name of your Post man. 'Phone him for your free trial supply, or send direct to

THE FREDERICK POST CO., BOX 803, CHICAGO

POST

INSTRUMENTS • EQUIPMENT • BLUE PRINT PAPERS • KINDRED SENSITIZED PRODUCTS

POST

NATIONWIDE NETWORK OF POST DEALERS

Atlanta—Georgia Blue Print Co.
Birmingham—James A. Head, Inc.
Boston—Boston Blue Print Co.
Buffalo—Buffalo Blue Print Co.
Chicago—Frederick Post Co.
Cincinnati—Queen City Blue Print Co.
Cleveland—The City Blue Printing Co.
Columbus—Franklin Blue Print & Supply Co.
Dallas—The Rush Co.
Dayton—Gem City Blue Print & Supply Co.
Denver—W. H. Kistler Stationery Co.
Detroit—Frederick Post Co.
Fort Wayne—Fort Wayne Blue Print & Supply Co.
Fort Worth—Majestic Reproduction Co.
Houston—Texas Br. Frederick Post Co.
Indianapolis—Indianapolis Blue Print & Litho Co.
Jacksonville—A. R. Cogswell
Kansas City—Western Blue Print Co.
Knoxville—Sehorn & Kennedy
Los Angeles—Stationers Corporation
Memphis—Wray Williams Blue Print Co.
Milwaukee—Frederick Post Co. of Wis.
New Orleans—Southern Blue Print Co.
New York—John R. Cassell Co.
Oklahoma City—The A & E Equipment Co.
Omaha—Standard Blue Print Co.
Philadelphia—Philadelphia Blue Print Co.
Pittsburgh—American Blue Printing Co.
Portland—J. K. Gill Co.
St. Louis—Service Blue Print & Photo Copy Co.
Salt Lake City—Salt Lake Blue Print & Supply Co.
Seattle—Kuker-Ranken, Inc.
Tampa—Office Equipment Company
Toledo—Toledo Blue Print & Paper Co.
Tulsa—Triangle Blue Print & Supply Co.
Washington, D. C.—R. E. MacMichael
Wichita—City Blue Print Co.

JUST PHONE OR WRITE YOUR NEAREST POST MAN

FOUNDATIONS

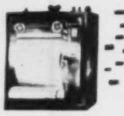
PRETEST UNDERPINNING
CONCRETE-STEEL PILES
MASS CONCRETE CONSTRUCTION
HEAVY SHORING
DRILLED-IN CAISSONS

DRILLED-IN CAISSONS
FOUNDATIONS
UNDERPINNING

Send for catalogs descriptive of the latest foundation types and methods.

SPENCER, WHITE & PRENTIS, INC.
10 EAST 40th ST. NEW YORK, N. Y.

This is where Yehudi lives



● It's the thermostatic control on our oil-fired kettles . . . and it maintains constant temperatures in the all-important zinc bath.

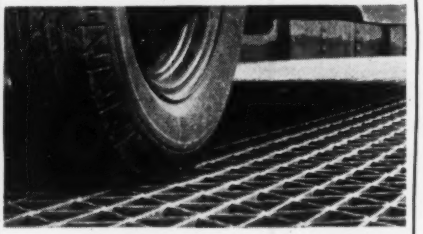
It's just one of the aids to human skill that speed our work and insure its uniform quality. It's another reason why Enterprise Galvanizing Company can be depended upon to meet the most exacting specifications.

ENTERPRISE
GALVANIZING
COMPANY
2501 E. CUMBERLAND ST., PHILA., PA.

"To Economize—Galvanize at Enterprise!"

IRVING DECKING

The Open Steel Bridge Pavement
Lightweight • Non-Skid • Economical
One-Piece • Clean • Permanent



CAN YOU TOP THIS?

On the world's longest highway vertical lift and adjacent spans, shown below, $250,000 was saved in structural members, lifting apparatus, etc., through the use of **Irving Decking.**

Add to this amount the savings in maintenance charges over a period of years and you'll understand why **Irving Decking** is the most economical flooring available.

May we send our catalog?

IRVING SUBWAY GRATING CO., INC.
5008 27th Street
LONG ISLAND CITY, NEW YORK

Literature Available

ARC WELDING—The "Fleet-Fillet" technique of arc welding, which permits up to 100% faster fillet welding and which will greatly speed up production of welded ships, tanks, guns, and other war-vital products, is described and illustrated in a new bulletin just published by The Lincoln Electric Co., Cleveland, Ohio. It contains 18 pages, $8^1/_2 \times 11$ in.

ARC WELDING—An illustrated arc welding inspection chart, presenting the different types of welds obtained when the work is done normally, with normal current, voltage and speed, as compared with those obtained when these factors are not normal, has recently been published by The Lincoln Electric Co., Cleveland, Ohio. The chart includes a table indicating the burn-off of the electrode, the penetration of fusion, the appearance of the bead and the sound of the arc with each value of current, voltage, and speed of welding.

ELECTRICAL EQUIPMENT—A 64-page 1942 revision of the "Quick Selector Catalog" is announced by the Westinghouse Electric and Mfg. Co. Issued twice a year, this catalog simplifies the selection of many types of electrical equipment. Write to department 7-N-20, East Pittsburgh, Penna.

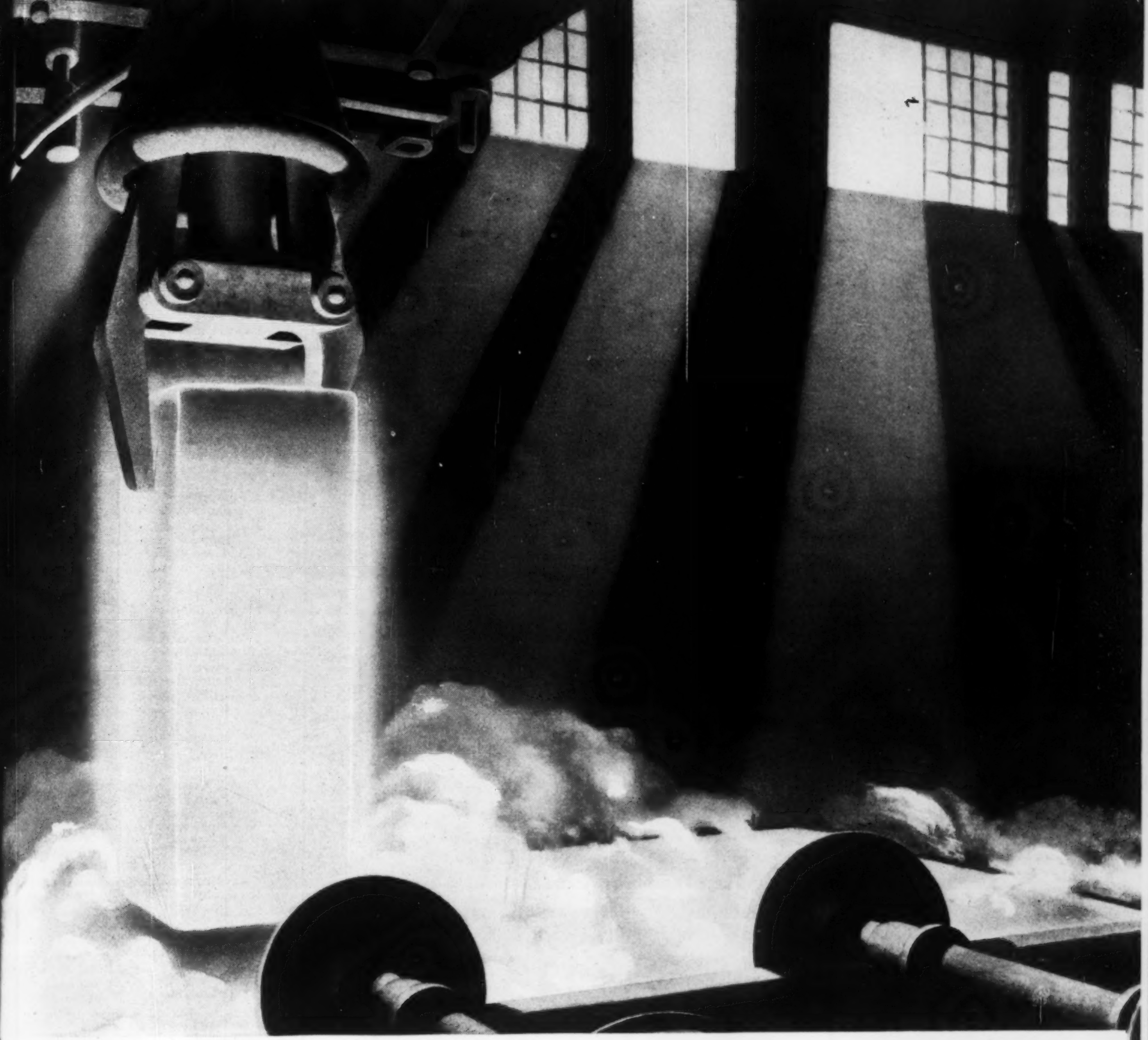
LUBRICATING SYSTEM—A 4-page folder complete with engineering diagram describes the Trabon single pipe centralized system that lubricates all the connected bearings without employing any springs, diaphragms, packing or exposed moving parts. Trabon Engineering Corp., 1814 E. 40th St., Cleveland, Ohio.

METERS—Originating as a flow meter catalog, "Flow Meters by Cochrane" has grown to a 52-page handbook of instrument application to steam, water, air, gas, and viscous, volatile, and corrosive fluid measurement. Considerable space is devoted to the importance of flow records in the efficient operation of boiler and turbine rooms and various process departments. Write for Publ. 3010. Cochrane Corporation, 17th St. and Allegheny Ave., Philadelphia, Penna.

OIL CIRCUIT BREAKERS—Small oil circuit breakers designed for use on alternating current circuits in industrial plants and power houses where interrupting capacities of 50,000 kva are required, are described and illustrated in a new 12-page catalog just released by the Roller Smith Company, Bethlehem, Penna.

SWITCHBOARD INSTRUMENTS—Direct current and alternating current indicating instruments for mounting on switchboards are described in a new 12-page catalog, No. 4220, published by the Roller-Smith Co., Bethlehem, Penna.

TIMBER—A timely, 8-page bulletin, titles, "Stepping Up War Production with Redwood," has been prepared to acquaint engineers, architects, contractors, and others, with situations where jobs are done better and quicker with Redwood than with materials formerly used, but now under war restrictions. California Redwood Association, 405 Montgomery St., San Francisco, Calif.



PUTTING MUSCLE IN STEEL

STEEL—the strong man of America—is not by nature a Samson. Muscle must be developed by adding ferro-alloys which remove strength-stealing impurities and give extra qualities before the steel is tough enough to play its part in today's fast-moving world.

One of the most important of these alloys is ferromanganese. Used as a scavenger in nearly all grades of steel, it removes oxygen and minimizes the harmful effects of sulphur. With the addition of manganese, hot steel can be rolled without cracking.

Cleansing is not the only role that manganese plays in the giants' game of steelmaking. In alloying amounts, manganese refines the structure of steel, thus giving it extra strength and ductility. As increasing amounts of manganese are added, exceptional properties are obtained. For instance, a steel containing 13 per cent manganese withstands the tough torture of jagged rock on steam shovel jaws.

We do not make steel of any kind. But we have for over thirty-five years carried on intensive and continuous research and development with ferro-alloys and alloying metals used in steelmaking. These include manganese, chromium, silicon, vanadium, tungsten, zirconium, columbium, and calcium.

Low-carbon ferromanganese, medium-carbon ferromanganese, and silico-manganese—three manganese alloys which owe their present wide use to our efforts—have greatly speeded and simplified the production of many grades of steel, including stainless steel. You are invited to tap our reservoir of information about ferro-alloys and their use in making the quality steels of today.

• • •

The progress made by Electro Metallurgical Company in the manufacture and use of ferro-alloys and in the development of alloy steels has been greatly facilitated by metallurgical research in the laboratories of Electro Metallurgical Company and Union Carbide Company; by the advances in electrical furnace electrodes and techniques of National Carbon Company, Inc.; and by the broad experience in the production, fabrication, and treatment of metals of Haynes Stellite Company and The Linde Air Products Company. All of these companies are Units of Union Carbide and Carbon Corporation.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 EAST 42ND STREET UCC NEW YORK, N. Y.

FOR VICTORY
BUY
UNITED STATES
WAR
BONDS
AND
STAMPS

THE AXIS WANTS YOUR BUSINESS

THIS is more than a war of mechanical monsters clashing in the night . . . more than a war of production.

It is a war for markets—*your* markets! The Axis wants your business—wants to destroy it once and for all.

With so much at stake, there is no doubt you will want to do everything you can to meet this Axis threat. Two ways are open: Speed production and put 10 percent of your income into WAR BONDS! The only answer to enemy tanks and planes is *more* American tanks and planes—and your regular, month-by-month purchases of War Bonds will help supply them. Buy now *and keep buying.*

THE GOAL: 10% OF EVERYONE'S INCOME IN WAR BONDS

When you install the Pay-Roll War Savings Plan (approved by organized labor), you not only perform a service for your country but for your *employees.* Simple to install, the Plan provides for regular purchases of War Bonds through voluntary pay-roll allotments.

Write for details *today!* Treasury Department, Section R, 709 12th St. NW., Washington, D. C.

EVERYBODY EVERY PAYDAY 10%

War Savings Bonds

This space is a contribution to Winning the War by CIVIL ENGINEERING

INDEX OF PRODUCTS

- Acetylene
    - Air Reduction Sales Co.
- Acetylene Generators
    - Air Reduction Sales Co.
- Airport Drainage
    - Armco Drainage Products Assn.
    - Lock Joint Pipe Co.
- Air Raid Shelters
    - Armco Drainage Products Assn.
- Alloys, Ferro
    - Electro Metallurgical Co., Unit of Union Carbide and Carbon Corp.
- Altimeters
    - American Paulin System
- Aluminum, Structural
    - Aluminum Co. of America
- Arc Welding Equipment
    - Lincoln Electric Co.
- Asphalt
    - Standard Oil Co. (Indiana)
- Asphalt Plank Bridge and Industrial Flooring
    - Philip Carey Mfg. Co.
- Bars, Aluminum
    - Aluminum Co. of America
- Bars, Iron and Steel
    - Bethlehem Steel Co.
    - Carnegie-Illinois Steel Corp.
- Blower Pipe, Steel, for Ventilation Purposes
    - Lock Joint Pipe Co.
- Blue Print Papers
    - Frederick Post Co.
- Borings, Test
    - MacArthur Concrete Pile Corp.
    - Raymond Concrete Pile Co.
    - Spencer, White & Prentis, Inc.
- Bridges
    - Bethlehem Steel Co.
- Bridge Floors, Grating
    - Irving Subway Grating Co., Inc.
- Bridge Planks, Mineral Surfaced Asphalt
    - Philip Carey Mfg. Co.
    - Johns-Manville Corp.
- Buildings, Steel
    - Bethlehem Steel Co.
- Cables, Electric
    - Lincoln Electric Co.
- Caissons
    - Raymond Concrete Pile Co.
    - Spencer, White & Prentis, Inc.
- Calcium Chloride
    - Solvay Sales Corp.
- Cement Portland
    - Lone Star Cement Corp.
- Cement, High - Early - Strength Portland
    - Lone Star Cement Corp.
- Chlorine
    - Solvay Sales Corp.
- Concrete Admixtures
    - Johns-Manville Corp.
- Concrete, Curing
    - Johnson-March Corp.
- Concrete Reinforcement
    - Bethlehem Steel Co.
    - Carnegie-Illinois Steel Corp.
- Conductors, Lightning
    - West Dodd Lightning Conductor Corp.
- Contractors
    - MacArthur Concrete Pile Corp.
    - Raymond Concrete Pile Co.
    - Spencer, White & Prentis, Inc.
- Corrugated Sheets, Aluminum
    - Aluminum Co. of America
- Corrugated Sheets, Asbestos-Cement
    - Johns-Manville Corp.
- Cresosoted Piles, Poles, Ties and Timber
    - American Creosoting Co.
- Cribbing, Metal
    - Armco Drainage Products Assn.
- Culverts, Asbestos-Cement
    - Johns-Manville Corp.
- Culverts, Cast Iron
    - Cast Iron Pipe Research Assn.
    - U. S. Pipe & Foundry Co.
- Culverts, Corrugated Iron and Sheets
    - Armco Drainage Products Assn.
- Culverts, Reinforced Concrete
    - Lock Joint Pipe Co.
- Curing Compounds
    - Johnson-March Corp.
- Damp-Proof Compounds
    - Barrett Division, Allied Chemical and Dye Corp.
    - Philip Carey Mfg. Co.
- Drafting Instruments and Materials
    - Keuffel & Esser Co.
    - Frederick Post Co.
- Drafting Room Furniture
    - Frederick Post Co.
- Drains, Perforated Iron
    - Armco Drainage Products Assn.
- Drains, Reinforced Concrete
    - Lock Joint Pipe Co.
- Drawing Supplies
    - Joseph Dixon Crucible Co.
    - Keuffel & Esser Co.
- Engineers
    - MacArthur Concrete Pile Corp.
    - Raymond Concrete Pile Co.
    - Spencer, White & Prentis, Inc.
- Engineering Instruments
    - American Paulin System
    - Keuffel & Esser Co.
- Engineering Tapes and Scales
    - Frederick Post Co.
- Expansion Joints, Asphalt or Cork
    - Johns-Manville Corp.
- Ferro-Alloys
    - Electro Metallurgical Co., Unit of Union Carbide and Carbon Corp.
- Filler, Asphalt
    - Philip Carey Mfg. Co.
- Flooring, Aluminum
    - Aluminum Co. of America
- Flooring, Asphalt Tile
    - Johns-Manville Corp.
- Flooring, Grating
    - Irving Subway Grating Co., Inc.
- Flooring, Shock-Absorbing
    - Celotex Corp.
- Flooring, Steel
    - Carnegie-Illinois Steel Corp.
- Flux, Welding, Brazing, Etc.
    - Air Reduction Sales Co.
- Foundations
    - MacArthur Concrete Pile Corp.
    - Raymond Concrete Pile Co.
    - Spencer, White & Prentis, Inc.
    - Union Metal Manufacturing Co.
- Galvanizing and Galvanized Products
    - Enterprise Galvanizing Co.
- Gauges, Acetylene, Oxygen
    - Air Reduction Sales Co.
- Generators, Electric
    - Lincoln Electric Co.
- Grating, Steel Flooring
    - Irving Subway Grating Co., Inc.
- Inks, Waterproof, Pigment, Drawing
    - Keuffel & Esser Co.
- Instruments
    - American Paulin System
    - Buff & Buff Co.
    - Keuffel & Esser Co.
- Insulating Materials
    - Celotex Corp.
- Joints, Expansion, Paving
    - Barrett Division, Allied Chemical & Dye Corp.
    - Philip Carey Mfg. Co.
- Lettering Guides
    - Keuffel & Esser Co.
- Levels
    - Buff & Buff Co.
    - Keuffel & Esser Co.
- Lightning Protection
    - West Dodd Lightning Conductor Corp.
- Machinery, Pipe Cutting and Beveling
    - Air Reduction Sales Co.
- Measuring Tapes
    - Keuffel & Esser Co.
- Metal Connectors for Timber Joints
    - Timber Engineering Co.
- Metal Termite Shields
    - Timber Engineering Co.
- Meters, Electric
    - Lincoln Electric Co.
- Motors, Electric
    - Lincoln Electric Co.

Continued on page 37

INDEX OF PRODUCTS

Continued from page 36

NICKEL AND ITS ALLOYS
International Nickel Co., Inc.

OXYGEN
Air Reduction Sales Co.

PAINTS
Barrett Division, Allied Chemical & Dye Corp.

PAINT PIGMENT, ALUMINUM
Aluminum Co. of America

PAPER, DRAWING AND TRACING
Keuffel & Esser Co.

PARTITION MATERIALS
Celotex Corp.

PAVING MATERIALS
Barrett Division, Allied Chemical & Dye Corp.
Lone Star Cement Corp.
Standard Oil Co. (Indiana)

PENCILS
Joseph Dixon Crucible Co.

PENSTOCKS
Bethlehem Steel Co.
Lock Joint Pipe Co.

PILES, CONCRETE
MacArthur Concrete Pile Corp.
Raymond Concrete Pile Co.
Union Metal Manufacturing Co.

PILES, CREOSOTED
American Creosoting Co.

PILES, STEEL BEARING
Bethlehem Steel Co.
Carnegie-Illinois Steel Corp.

PILES, STEEL SHELL
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.
Union Metal Manufacturing Co.

PILING, STEEL SHEET
Bethlehem Steel Co.
Carnegie-Illinois Steel Corp.
Union Metal Manufacturing Co

PIPE, ASBESTOS-CEMENT
Johns-Manville Corp.

PIPE, CAST IRON
Cast Iron Pipe Research Assn.
U. S. Pipe & Foundry Co.

PIPE, REINFORCED CONCRETE
Lock Joint Pipe Co.

PIPE COATING, ASPHALT
Standard Oil Co. (Indiana)

PIPE FITTINGS, CAST IRON
Cast Iron Pipe Research Assn.
U. S. Pipe & Foundry Co.

PIPE WRAPPING, ASBESTOS FELT
Johns-Manville Corp.

PLASTIC, ASPHALT
Philip Carey Mfg. Co.

POLES, CREOSOTED
American Creosoting Co.

PORTLAND CEMENT
Lone Star Cement Corp.

PORTLAND CEMENT, HIGH - EARLY-STRENGTH
Lone Star Cement Corp.

PUMPS
Layne & Bowler, Inc.

REGULATORS, OXYACETYLENE
Air Reduction Sales Co.

ROAD OILS
Barrett Division, Allied Chemical & Dye Corp.
Standard Oil Co. (Indiana)

ROAD SURFACING MATERIALS
Barrett Division, Allied Chemical & Dye Corp.
Standard Oil Co. (Indiana)

ROOFING MATERIALS
Barrett Division, Allied Chemical & Dye Corp.
Philip Carey Mfg. Co.
Johns-Manville Corp.

ROPE, WIRE
Bethlehem Steel Co.

SEWER PIPE, REINFORCED CONCRETE
Lock Joint Pipe Co.

SHEETS, ALUMINUM
Aluminum Co. of America

SHEETS, ASBESTOS-CEMENT
Johns-Manville Corp.

SHEETS, IRON AND STEEL
Bethlehem Steel Co.
Carnegie-Illinois Steel Corp.

SHORING
Spencer, White & Prentis, Inc.

SODA ASH
Solvay Sales Co.

STACKS
Bethlehem Steel Co.

STATIC CONTROL EQUIPMENT
West Dodd Lightning Conductor Corp.

STEEL, STRUCTURAL
Bethlehem Steel Co.
Carnegie-Illinois Steel Corp.

STEEL SHELLS
MacArthur Concrete Pile Corp.

STEPS, SAFETY GRATING
Irving Subway Grating Co., Inc.

STORM SEWERS, CORRUGATED IRON
Armco Drainage Products Assn.

SUBAQUEOUS INTAKES AND OUTFALLS, REINFORCED CONCRETE
Lock Joint Pipe Co.

SURVEYING INSTRUMENTS
American Paulin System
Buff & Buff Co.
Keuffel & Esser Co.

TANKS
Bethlehem Steel Co.

TAR
Barrett Division, Allied Chemical & Dye Corp.

TERMITE SHIELDS
Timber Engineering Co.

TIES, CREOSOTED
American Creosoting Co.

TIMBER, CREOSOTED
American Creosoting Co.

TIMBER JOINT CONNECTORS
Timber Engineering Co.

TORCHES, WELDING AND CUTTING
Air Reduction Sales Co.

TOWERS, STEEL
Bethlehem Steel Co.

TRACING DUPLICATIONS
Frederick Post Co.

TRACK, INDUSTRIAL AND PORTABLE
Bethlehem Steel Co.
Carnegie-Illinois Steel Corp.

TRANSITS
Buff & Buff Co.
Keuffel & Esser Co.

UNDERPINNING
MacArthur Concrete Pile Corp.
Raymond Concrete Pile Co.
Spencer, White & Prentis, Inc.

WATERPROOFING MATERIALS
Barrett Division, Allied Chemical & Dye Corp.

WATERPROOFING, MEMBRANE
Philip Carey Mfg. Co.

WATER SUPPLY EQUIPMENT
Layne & Bowler, Inc.

WATER SUPPLY PIPE, REINFORCED CONCRETE
Lock Joint Pipe Co.

WELDING AND CUTTING APPARATUS
Air Reduction Sales Co.

WELDING MACHINES, ELECTRIC ARC
Lincoln Electric Co.

WELDING RODS AND WIRE
Lincoln Electric Co.

WELL WATER SYSTEMS
Layne & Bowler, Inc.

WIRE ROPE AND STRANDS
Bethlehem Steel Co.

WOOD PRESERVATIVES
Barrett Division, Allied Chemical & Dye Corp.

Alphabetical Index to Advertisers shown on page 38

The Society reserves the privilege of rejecting advertisements inconsistent with its ethical procedure

Don't Wait For FREEZING Weather
PROTECT CONCRETE AT 50° F. OR LOWER!

Do you realize how much a drop in temperature to 50° F. or below slows the development of strength of portland cement concrete? Calcium Chloride by accelerating development of strength, offsets the dangerous effects of lowering temperatures. In addition, it increases workability, assures proper curing and increases ultimate strength.

Specifications should therefore include Calcium Chloride for concrete when the temperature is expected to reach 50° F. or lower during the 24-hour period following pouring. Its use does not in any way change the normal chemical action of portland cement.

Calcium Chloride is called for in many Federal, State and Private specifications. All facts regarding advantages are substantiated by field work and laboratory research.

use **SOLVAY**
CALCIUM CHLORIDE
with all
PORTLAND CEMENTS

Send for book giving complete facts to Dept. 80-10, Solvay Sales Corporation, 40 Rector Street, New York, N. Y.

It can be Your Library Department!

A trained staff and a fully equipped library would be a valuable addition to your company. The Service Bureau of the Engineering Societies Library can be that new department in your organization, yet more adequately manned and better equipped than any individual organization library could possibly be.

Use this service. Over 4,000 bibliographies on engineering subjects are on file. 150,000 engineering texts and files of every worthwhile periodical are available for further research to meet your specific needs. A letter, a telephone call or a telegram will place the Service Bureau at your service.

Use the service of *your* Engineering Library
The charges cover only the cost of the service and represent but a fraction of the value you will receive.

The Engineering Societies Library
29 West 39th Street, New York, N. Y.

BUFF
TRADE MARK TRADE MARK

WORLD FAMOUS FOR 74 YEARS

Transits and Levels for Civil and Mining Engineers

Buff precision and design are continuously in the forefront.

ENGINEERS and contractors know that BUFF performance is accurate and sure—with adjustments that hold permanently.

THE BUFF "X" TELESCOPE

has the finest and highest definition and simplest lens system. It is useful when the light is dim.

Buff is used almost exclusively on the largest works in this country and Canada and Mexico and So. America.

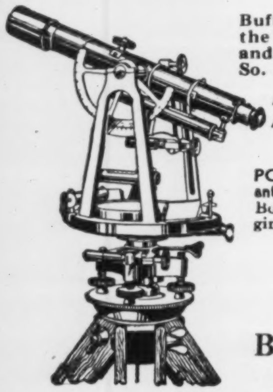
Astronomical lens experts.

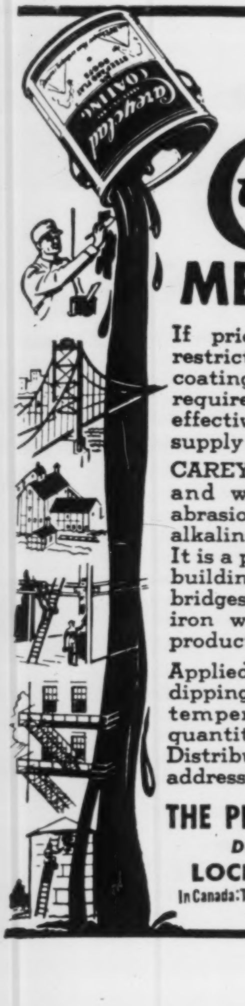
All makes—intelligently repaired and regraduated by Factory Experts.

The finest work at the LOWEST POSSIBLE COST. Reliability and guaranteed work. A special Souvenir Plumb Bob sent gratis to graduate Civil Engineers.

THE Greatest ACCURACY
THE Hardest BRONZE
THE Simplest DESIGN

Buff & Buff Company
Jamaica Plain, Massachusetts





LOW-COST PROTECTION with

Careyclad
BLACK
METAL COATING

If priority listings or rationing have restricted your normal supply of metal coatings, CAREYCLAD may meet your requirements. CAREYCLAD does an effective job; it's economical; and the supply is plentiful.

CAREYCLAD protects metal against rust and weather—is extremely durable, abrasion resistant, and resistant to acid, alkaline and salt atmospheric conditions. It is a practical low-cost coating for metal buildings, iron sheets, structural steel, bridges, heavy machinery, ornamental iron work, and numerous sheet metal products.

Applied by spray painting, brushing or dipping, at everyday indoor or outdoor temperatures. Promptly available in quantity through CAREY Branches and Distributors everywhere. Write for details, address Department 81.

THE PHILIP CAREY MFG. COMPANY
Dependable Products Since 1873
LOCKLAND, CINCINNATI, OHIO
In Canada: The Philip Carey Company, Ltd. Office and Factory: Lennoxville, P.Q.

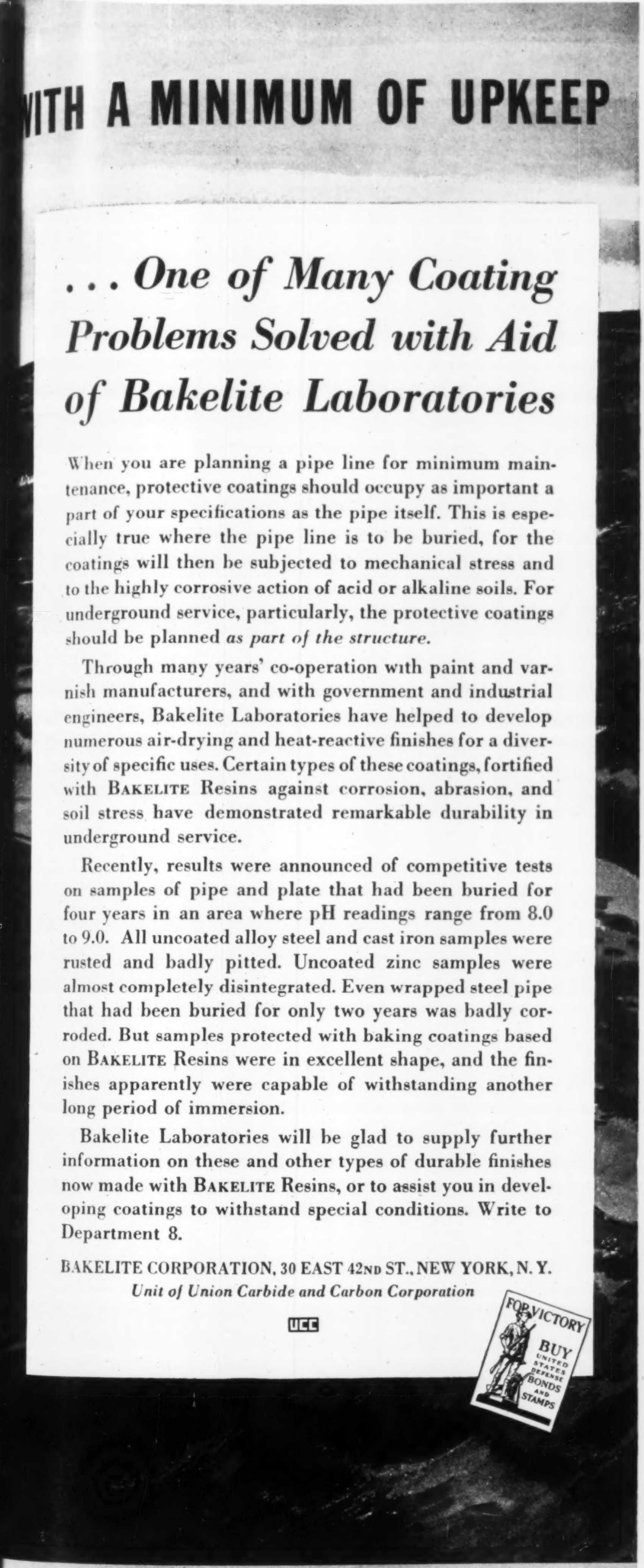
INDEX TO ADVERTISERS

and their advertising agencies

AIR REDUCTION SALES COMPANY 8
G. M. Basford Company
ALUMINUM COMPANY OF AMERICA . . *Back Cover*
Fuller & Smith & Ross, Inc.
AMERICAN CREOSOTING COMPANY 31
Russell T. Gray, Inc.
AMERICAN PAULIN SYSTEM 32
ARMCO DRAINAGE PRODUCTS ASSOCIATION . . 19
BARRETT DIVISION, ALLIED CHEMICAL & DYE CORPORATION 21
McCann-Erickson, Inc.
BETHLEHEM STEEL COMPANY 17
BUFF & BUFF COMPANY 38
PHILIP CAREY MANUFACTURING COMPANY . . 38
S. C. Baer Company
CARNEGIE-ILLINOIS STEEL CORPORATION. 2 and 3
(United States Steel Corporation subsidiary)
Batten, Barton, Durstine & Osborn, Inc.
CAST IRON PIPE RESEARCH ASSOCIATION . . . 12
Alley & Richards Company
CELOTEX CORPORATION 28
MacFarland, Aveyard & Company
DIXON'S *Typhonite* ELDORADO PENCILS . . . 25
Federal Advertising Agency
ELECTRO METALLURGICAL COMPANY 35
ENTERPRISE GALVANIZING COMPANY 34
R. E. Lovekin Corporation
INTERNATIONAL NICKEL COMPANY, INC. . . . 1
Marschalk & Pratt Company
IRVING SUBWAY GRATING CO., INC. 34
JOHNS-MANVILLE CORPORATION . . . . 4 and 5
J. Walter Thompson Company
JOHNSON-MARCH CORPORATION 32
Alan B. Sanger
KEUFFEL & ESSER COMPANY 13
Doremus & Company
LAYNE & BOWLER, INC. 30
O'Callaghan Advertising Agency, Inc.
LINCOLN ELECTRIC COMPANY . . . . *Third Cover*
Griswold-Eshleman Company
LOCK JOINT PIPE COMPANY 6
Needham & Grohmann, Inc.
LONE STAR CEMENT CORPORATION 23
Cowan & Dengler, Inc.
MACARTHUR CONCRETE PILE CORPORATION . 10
G. M. Basford Company
FREDERICK POST COMPANY 33
Western Advertising Agency, Inc.
RAYMOND CONCRETE PILE COMPANY *Second Cover*
Needham & Grohmann, Inc.
SOLVAY SALES CORPORATION 37
Atherton & Currier, Inc.
SPENCER, WHITE & PRENTIS, INC. 34
STANDARD OIL COMPANY (INDIANA) 27
McCann-Erickson, Inc.
TIMBER ENGINEERING COMPANY 7
Campbell-Ewald Company
UNION METAL MANUFACTURING COMPANY . 15
Griswold-Eshleman Company
U. S. PIPE & FOUNDRY COMPANY 29
Alley & Richards Company
U. S. STEEL CORPORATION SUBSIDIARY . 2 and 3
Batten, Barton, Durstine & Osborn, Inc.
WEST DODD LIGHTNING CONDUCTOR CORPORATION 26
Carter, Jones & Taylor

Index to Products Shown on Pages 36 and 37

ITH A MINIMUM OF UPKEEP



. . . One of Many Coating Problems Solved with Aid of Bakelite Laboratories

When you are planning a pipe line for minimum maintenance, protective coatings should occupy as important a part of your specifications as the pipe itself. This is especially true where the pipe line is to be buried, for the coatings will then be subjected to mechanical stress and to the highly corrosive action of acid or alkaline soils. For underground service, particularly, the protective coatings should be planned *as part of the structure.*

Through many years' co-operation with paint and varnish manufacturers, and with government and industrial engineers, Bakelite Laboratories have helped to develop numerous air-drying and heat-reactive finishes for a diversity of specific uses. Certain types of these coatings, fortified with BAKELITE Resins against corrosion, abrasion, and soil stress have demonstrated remarkable durability in underground service.

Recently, results were announced of competitive tests on samples of pipe and plate that had been buried for four years in an area where pH readings range from 8.0 to 9.0. All uncoated alloy steel and cast iron samples were rusted and badly pitted. Uncoated zinc samples were almost completely disintegrated. Even wrapped steel pipe that had been buried for only two years was badly corroded. But samples protected with baking coatings based on BAKELITE Resins were in excellent shape, and the finishes apparently were capable of withstanding another long period of immersion.

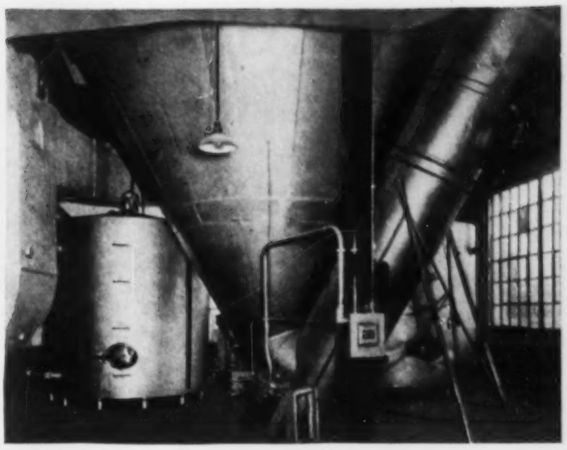
Bakelite Laboratories will be glad to supply further information on these and other types of durable finishes now made with BAKELITE Resins, or to assist you in developing coatings to withstand special conditions. Write to Department 8.

BAKELITE CORPORATION, 30 EAST 42ND ST., NEW YORK, N. Y.
Unit of Union Carbide and Carbon Corporation

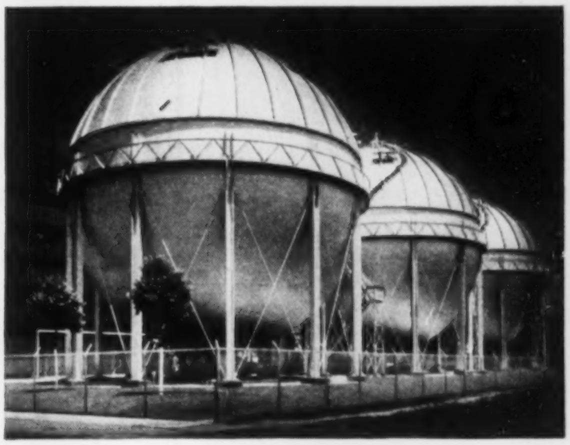
UCC

FOR VICTORY BUY UNITED STATES DEFENSE BONDS AND STAMPS

OF THE STRUCTURE



Making Black Iron Equipment Resistant to Corrosion—Made from readily obtainable black iron, this equipment—used in dehydrating eggs—is lined with a special BAKELITE Phenolic Resin Baking Finish. Highly resistant to chemicals, it not only safeguards the purity of 70,000 dozen eggs a day, but may be cleaned in only one-quarter the time of other equipment because of its glossy, impervious surface.



Protecting Exteriors of Liquid Gas Storage Tanks—Selection of materials used in constructing these three liquified gas storage tanks—each holding the equivalent of 50,000,000 cubic feet of natural gas—was of utmost importance because of the nature and extent of their contents. Tanks were erected recently by Pittsburgh-Des Moines Steel Company for a middle western gas company. Protective coating specified is an aluminum vehicle based on BAKELITE Resin.

Safeguarding Drinking Water—The "Sterozone", a mobile water-purification plant, developed by Donald K. Allison—represents an interesting use of a baking coating based on BAKELITE Resin. The non-porous coating protects both internal metal parts from the highly corrosive action of ozone generated in the purifying process, and external parts from climatic conditions. In addition, it also prevents electrical leakage.

McGraw, William Harold, Assoc. M., reinstated Sept. 18, 1942.

Mackey, Lincoln, Assoc. M., reinstated Sept. 17, 1942.

Miller, Joseph James, Assoc. M., reinstated Sept. 28, 1942.

Moriarty, Clarence, M., reinstated Sept. 16, 1942.

Morton, Donald Ross, Jr., Jun., reinstated Sept. 22, 1942.

Nelson, Jack Minor, Jun., reinstated Sept. 15, 1942.

Randolph, Gayle Bowden, Jr., Jun., reinstated Sept. 18, 1942.

Reinhart, Martin John, Assoc. M., reinstated Sept. 17, 1942.

Sayers, Floyd William, Assoc. M., reinstated Sept. 23, 1942.

Schmitz, Erwin Anthony, M., reinstated Oct. 5, 1942.

Shaw, Walter Farnsby, Assoc. M., reinstated Oct. 6, 1942.

Shiels, Thomas David, Assoc. M., reinstated Sept. 28, 1942.

Slattebo, Oscar Ingvald, Jun., reinstated Sept. 28, 1942.

Streiff, Abraham, M., reinstated Sept. 16, 1942.

Sturdevant, James Hiram, M., reinstated Sept. 30, 1942.

Vanasco, Albert Joachim, Jun., reinstated Oct. 9, 1942.

RESIGNATIONS

Kavanaugh, William Francis, Assoc. M., resigned Sept. 18, 1942.

Nace, Robert Regnault, M., resigned Sept. 16, 1942.

Applications for Admission or Transfer

Condensed Records to Facilitate Comment from Members to Board of Direction

November 1, 1942

NUMBER 11

The Constitution provides that the Board of Direction shall elect or reject all applicants for admission or for transfer. In order to determine justly the eligibility of each candidate, the Board must depend largely upon the membership for information.

Every member is urged, therefore, to scan carefully the list of candidates published each month in CIVIL ENGINEERING *and to furnish the Board with data which may aid in determining the eligibility of any applicant.*

It is especially urged that a definite recommendation as to the proper grading be given in each case, inasmuch as the grading must be based upon the opinions of those who know the applicant personally as well as upon the nature and extent of his professional experience. Any facts derogatory to the personal character or professional reputation of an applicant should be promptly communicated to the Board.

Communications relating to applicants are considered strictly confidential.

The Board of Direction will not consider the applications herein contained from residents of North America until the expiration of 30 days, and from non-residents of North America until the expiration of 90 days from the date of this list.

MINIMUM REQUIREMENTS FOR ADMISSION

GRADE	GENERAL REQUIREMENT	AGE	LENGTH OF ACTIVE PRACTICE	RESPONSIBLE CHARGE OF WORK
Member	Qualified to design as well as to direct important work	35 years	12 years	5 years RCM*
Associate Member	Qualified to direct work	27 years	8 years	1 year RCA*
Junior	Qualified for sub-professional work	20 years	4 years	
Affiliate	Qualified by scientific acquirements or practical experience to cooperate with engineers	35 years	12 years	5 years RCM*

* In the following list RCA (responsible charge—Associate Member standard) denotes years of responsible charge of work as principal or subordinate, and RCM (responsible charge—Member standard) denotes years of responsible charge of IMPORTANT work i. e., work of considerable magnitude or considerable complexity.

APPLYING FOR MEMBER

Bake, William Sibson (Assoc. M.), Detroit, Mich. (Age 61) (Claims RC 7.5 D 6.2) Nov. 1911 to date with Pere Marquette Ry. Co. as Asst. Engr., Div. Engr., Land and Tax Agt. and Insurance Commr., and since Sept. 1932 General Real Estate Agt.

Beesley, Ben Branson, Paris, Tex. (Age 40) (Claims RCA 2.6 RCM 16.2) 1941 to date Senior Civ. Engr. (Civil Service), U.S. Army Engrs.; previously Engr., WPA.

Brown, William Isaac (Assoc. M.), Newport, R.I. (Age 41) (Claims RCA 4.2 RCM 6.6) March 1940 to date Lt. Commdr., CEC, U.S.N.R.; previously Asst. Engr., U.S. Bureau Reclamation, Denver, Colo.

Glenn, Howard Emmit (Assoc. M.), Clemson, S.C. (Age 45) (Claims RCA 5.2 RCM 15.0) Sept. 1924 to Sept. 1927 Asst. Prof., and Sept. 1927 to date Associate Prof., of Civ. Eng., Clemson (S.C.) Agricultural Coll.

Hedefine, Alfred (Assoc. M.), New York City. (Age 36) (Claims RCA 2.2 RCM 6.8) Jan. 1936 to date Detailer, Designer, Estimator and Associate Engr., Waddell & Hardesty, Cons. Engrs., New York City.

Jenney, Richard (Assoc. M.), Haverford, Pa. (Age 41) (Claims RCA 4.9 RCM 5.0) Nov. 1935 to date with United Engrs. & Constrs., Inc., Philadelphia, as Structural Designer, and (since April 1936) Structural Engr.

Keane, Edward Charles, Westwood, Mass. (Age 40) (Claims RCA 4.9 RCM 7.8) July 1941 to date with Shreve, Lamb & Harmon-Fay, Spofford & Thorndike; previously with Chas. T. Main, Inc., Cons. Engrs.; with Metropolitan Dist. Comm., Commonwealth of Massachusetts.

Kipper, Willis Francis, Manhattan, Kans. (Age 38) (Claims RC 8.2 D 3.4) Sept. 1934 to date County Engr., Riley County, Kans.

Lamb, Oren James, Pando, Colo. (Age 39) (Claims RCA 4.1 RCM 12.2) April 1942 to date Asst. Engr. with Black & Veatch; previously with Missouri Highway Dept.

Lewis, Perley Mitchell (Assoc. M.), Lincoln, Nebr. (Age 44) (Claims RCA 5.4 RCM 14.0) Sept. 1940 to date with U.S. Army as 1st Lieut. and (at present) Capt., Corps of Engrs.; previously Gen. Mgr., Lewis Bros. (Inc.)., Contrs.

Logan, James (Assoc. M.), Mount Holly, N.J. (Age 57) (Claims RCA 4.5 RCM 29.6) March 1934 to July 1937 Asst. State Highway Engr., and July 1937 to date State Highway Engr., of New Jersey.

McCreery, Donald Hull (Assoc. M.), Los Angeles, Calif. (Age 43) (Claims RCA 10.0 RCM 7.2) Nov. 1940 to date with Leeds, Hill, Barnard and Jewett as Senior Office Engr., and (since May 1941) Chf. Engr.; previously Associate with Frank A. Woodyard, Gen. Contr.

Marshall, Samuel Wagner, New York City. (Age 51) (Claims RCA 1.5 RCM 8.2) Jan. 1941 to date Chf. Engr., Caribbean Archt.-Engr., New York City; previously Chf. Engr. with Pennsylvania Dept. of Highways and Pennsylvania Turnpike Comm., Harrisburg, Pa.

Myhand, William Henry, Seattle, Wash. (Age 53) (Claims RCM 23.7) May 1942 to date with U.S. Army Engrs.; previously with CCC; Louisiana Geodetic Survey, etc.

Raiffeisen, Otto John, Pittsburgh, Pa. (Age 55) (Claims RCA 12.7 RCM 14.4) June 1924 to date Engr., Gulf Oil Corporation.

Rowland, William Joseph (Assoc. M.), Vicksburg, Miss. (Age 40) (Claims RCA 6.9 RCM 6.7) March 1931 to date with U.S. Waterways Experiment Station in various capacities; at present Capt., Corps of Engrs., U.S. Army.

Russell, George Raymond, Globe, Ariz. (Age 51) (Claims RCA 8.7 RCM 16.4) Feb. 1941 to date Chf. Project Engr., W. A. Bechtel Co., Bechtel-McCone-Parsons Corporation, San Francisco and Los Angeles; previously Cons. Engr. to refineries in Los Angeles basin area.

Shaw, Harry Breckenridge, Hyattsville, Md. (Age 43) (Claims RCA 4.9 RCM 15.8) Nov. 1938 to date Deputy Chf. Engr., Washington Suburban San. Comm.

Sorenson, Earl Emanuel, San Diego, Calif. (Age 47) (Claims RCM 17.8) Sept. 1928 to date with Div. of Highways, California Dept. of Public Works as Associate Highway Engr., Senior Highway Engr., and (at present) acting as Dist. Constr. Engr.

Storrer, Fredrick Ray (Assoc. M.), Dearborn, Mich. (Age 43) (Claims RCA 0.5 RCM 17.5) May 1925 to date with City of Dearborn as Asst. City Engr., and (since Jan. 1930) City Engr.

Tarleton, Colby Dutot (Assoc. M.), Honolulu, Hawaii. (Age 41) (Claims RCA 9.8 RCM 5.6) Feb. 1941 to date on active duty with CEC, U.S. Navy at Pearl Harbor, at present as Lt. Comdr.; previously with Honolulu Board of Water Supply.

Trotter, Joseph Pierce, Montgomery, Ala. (Age 42) (Claims RCA 11.1 RCM 9.0) April 1934 to date with Alabama Highway Dept., as Bridge Designer, Acting Bridge Engr., and (since Aug. 1938) Bridge Engr.

Turnbull, Willard Jay (Assoc. M.), Vicksburg, Miss. (Age 39) (Claims RCA 4.2 RCM 8.7) Nov. 1941 to date Engr., Chf. of Soils Div., U.S. Waterways Experiment Station; previously Soils Engr. and Chf. of Laboratory, Central Nebraska Public Power & Irrigation Dist.

Wittwer, Norman Carl, Trenton, N.J. (Age 47) (Claims RCM 18.5) at present Capt., Corps of Engrs., U.S. Army; Nov. 1940 to Sept. 1942 Designing Engr., E. I. du Pont de Nemours & Co., Wilmington, Del.; previously Superv. San. Engr., Rahway (N.J.) Valley Joint Meeting.

Wolff, William Robert (Assoc. M.), New York City. (Age 35) (Claims RCA 6.7 RCM 7.0) Sept. 1932 to date Water Engr. and (at present) Prin. Valuation Engr., New York State Public Service Comm.

APPLYING FOR ASSOCIATE MEMBER

Blazek, Harry James, Nashville, Tenn. (Age 38) (Claims RCA 3.9) April 1929 to date with U.S. Engr. Office in various capacities, since May 1942 loaned to U.S. Bureau of Reclamation to advise and consult on spillway flood studies.

Bradley, John Allen, Santa Ana, Calif. (Age 38) (Claims RCA 6.9 RCM 3.5) Dec. 1933 to date with Orange County Flood Control Dist. as Asst. Engr. to Chf. Engr., Chf. of Hydr.

AMERICA'S UNDERGROUND AT WORK . . . . . .

Lined up *against* sabotage and destruction—fighting fire with water. Just as volunteers are called into action when the enemy strikes, so, too, are the guardians stationed underground—the water supply lines of the threatened community. As important as public morale are the strength and quality of your firefighting mains. Can *they* take it?

Never—in the 37 years of its history—has there been a collapse or failure in a single length of Lock Joint Reinforced Concrete Pressure Pipe. Its underlying strength rests in the solid toughness of its concrete walls, in its steel skeleton and in the water-tight flexibility of its joints. Each unit of a Lock Joint Pressure line is a thick-walled bulwark of defense against terrific vibration and shock.

Construction and design make Lock Joint Reinforced Concrete Pipe your safest investment today—yet its manufacture and installation require a minimum of steel and manpower, two vital war needs. Specify Lock Joint!

LOCK JOINT PIPE COMPANY
Established 1905
AMPERE, NEW JERSEY
Denver, Colo. • Chicago, Ill. • Kenilworth, N. J. • Kansas City, Mo. • Rock Island, Ill.
White Plains, N. Y. • Valley Park, Mo. • Cleveland, Ohio • Hartford, Conn. • Navarre, Ohio

SCOPE OF SERVICES *Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply Mains as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous lines.*

LOCK JOINT
Reinforced Concrete
PRESSURE PIPE

Sec., and (since Aug. 1941) Asst. Flood Control Engr.

Brewer, Mathias, Jr., Caracas, Venezuela. (Age 30) (Claims RCA 8.0) Aug. 1941 to date Associate Engr., Consulting Engrs., C.A. (Parsons, Klapp, Brinckerhoff and Douglas); previously with Venezuelan Govt. in various capacities.

Brown, Hubert Hull, Phoenix, Ariz. (Age 44) (Claims RCA 17.1) Oct. 1922 to date (except April to July 1942) with Arizona Highway Dept. in various capacities, since July 1942 Acting Engr. of Materials.

Cashin, John Thomas, North Olmsted, Ohio. (Age 33) (Claims RC 3.0 D 1.4) Aug. 1939 to date Office Engr., Hunkin-Conkey Constr. Co., and (at present) Acting Supt.; previously with Dept. of Parks & Public Properties, Cleveland; with Republic Steel Corporation.

Davis, Reese, Cleveland, Ohio. (Age 63) (Claims RCA 15.8 RCM 7.0) June 1941 to date Draftsman and Asst. Engr., Ohio Highway Dept.; previously Draftsman for Cuyahoga County Engr.

Dunn, James Edwin, Richmond, Va. (Age 41) (Claims RCA 11.9) May 1925 to date with Portland Cement Association as Field Engr. and (since Feb. 1929) Dist. Engr.

Farrell, James Patrick, Drexel Hill, Pa. (Age 53) (Claims RCA 20.0 RCM 0.8) April 1942 to date Project Mgr., Duffy Constr. Corporation. New York City; previously Sales Mgr. and Engr., Petroleum Heat & Power Co., Philadelphia.

Ferriss, Frederick, Huntsville, Ala. (Age 36) (Claims RCM 10.5) Aug. 1941 to date with Whitman, Requardt & Smith, Huntsville Arsenal, as Asst. San. Engr., and (since June 1942) Dept. Head, San. Eng.; previously Prof. Engr. and Surveyor, Morristown, N.J.

Fish, Jackson Cooper, Los Angeles, Calif. (Age 36) (Claims RCA 3.9) March 1941 to date Executive Officer (Capt.), Combat Command "B," 5th Armored Div., Desert Maneuvers, Los Angeles; previously Engr., U.S. Gen. Land Office, U.S. Dept. of Interior; with Pecos River Joint Investigation.

Forshay, Raymond Leroy (Junior), Knoxville, Tenn. (Age 30) (Claims RCA 3.5) July 1936 to date successively Jun. Engr., Asst. Engr., Associate Engr., and (at present) Engr., TVA.

Graff, Charles Russell, Altadena, Calif. (Age 31) (Claims RCA 1.2) May 1941 to date Supt., Raymond Concrete Pile Co.; previously member of firm, Graff & Berry.

Harris, Edward Hooper (Junior), Bridgeport, Conn. (Age 27) (Claims RCA 3.9) April 1941 to date with Remington Arms Co., Inc., in various capacities, at present being Asst. to Asst. Wks. Mgr.; previously Asst. Dist. Supt. and Office Engr., WPA of Georgia, and with State Highway Board of Georgia.

Highleyman, Frank, Monroe, La. (Age 42) (Claims RCA 8.4 RCM 3.5) Aug. 1936 to May 1938 Project Engr., and June 1941 to date Asst. Engr., Black & Veatch; in the interim successively with Platte Valley Public Power & Irrigation Dist., Western Contr. Corporation, and WPA.

Horney, William Johnston, Jr., Guilford College, N.C. (Age 35) (Claims RCA 2.8) Feb. 1936 to Sept. 1942, Draftsman and Engr., Carolina Steel & Iron Co., Greensboro, N.C.

Horowitz, Fermond Cecil, (Junior), Los Angeles, Calif. (Age 28) (Claims RCA 2.8) Jan. 1941 to date Designing Engr. (Utilities), Leeds, Hill, Barnard & Jewett; previously with Los Angeles City Bridge Dept.; with Los Angeles County Design and Bldg. Depts.

Huddleston, Thomas, Little Rock, Ark. (Age 44) (Claims RCA 3.9 RCM 5.8) Aug. 1941–June 1942 Coordinating Engr. and Administrative Aide, The Lummus Co., Marche, Ark.; previously Area Supt., Ferguson-Oman Co., Milan, Tenn.; with Tarlton-McDonald Constr. Co., Little Rock, Ark.

Keelen, Charles Archie, Pittsburgh, Pa. (Age 36) (Claims RCA 3.5 RCM 1.0) 1941 to date Field Structural Engr., Portland Cement Association, Philadelphia, Pa.; previously Engr. for Metzger-Richardson Co., Pittsburgh.

Larsen, Herluf Thomsen (Junior), New Orleans, La. (Age 31) (Claims RCA 1.8) March 1942 to date 1st Lieut., Infantry, U.S. Army; previously Chf. Draftsman, Constr. QM, Howard Field, Canal Zone; Draftsman and Designer, Dept. of Subways and Superhighways, Chicago, Ill.

Lee, Fred (Junior), Houston, Tex. (Age 29) (Claims RCA 4.0) June 1935 to date Valuation Engr., until March 1941 with Gas Utilities Div., R.R. Comm. of Texas, and (since March 1941) with Shell Pipe Line Corporation.

McMillan, Mitchell Gredig, Knoxville, Tenn. (Age 40) (Claims RCA 11.6) March 1939 to date Engr., Knoxville Elec. Power and Water Board, Bureau of Water; previously Asst. Engr. for Knoxville Water Dept. and Bureau of Water.

Merten, Leonard Richard, New York City. (Age 36) (Claims RCA 1.7 RCM 3.2) April 1942 to date Designer, until June 1942 with Ford, Bacon & Davis, Inc., on work for Nicaro Nickel Co. at Oriente Province, Cuba, and after June 1942 with Nicaro Nickel Co. on same project; previously Mech. Designer, Walter Kidde Constr., Inc.; Draftsman, J. Floyd Yewell.

Murray, David Oliver, Willoughby, N.S.W., Australia. (Age 36) (Claims RCA 8.0) Jan. 1940 to date with Drawing Office, Australian Iron & Steel, Ltd.; previously Engr. of Oberon Shire.

Neill, William Donald, Indian Orchard, Mass. (Age 31) (Claims RCA 4.9) Feb. to July 1941 and Dec. 1941 to date Res. Engr., Stone & Webster Eng. Corporation; in the interim with O'Driscoll & Grove, Inc.

Platt, Howard Charles, San Anselmo, Calif. (Age 34) (Claims RCA 2.7 RCM 1.6) Aug. 1939 to date with Marin Mun. Water Dist., as Hydr. Eng. Designer, and (since April 1941) Senior Engr.; previously Asst. Engr., Federal Power Comm.

Rasp, Walter Frederick, Omaha, Nebr. (Age 36) (Claims RCA 8.5) May 1942 to date Draftsman, Union Pacific R.R. Co.; previously with Indiana Highway Comm. as Inspector, Project Engr., and Dist. Office Engr.

Reedy, Oliver Calmar (Junior), Denver, Colo. (Age 32) (Claims RCA 3.4) Oct. 1933 to date with Project Planning Sec., Bureau of Reclamation as Jun. Engr., Asst. Engr., and (since May 1942) Associate Engr.

Reid, James Howard (Junior), Honolulu, Hawaii. (Age 33) (Claims RCA 1.4 RCM 3.6) Aug. 1934 to date with U.S. Engr. Office, 3 years in North Pacific Div., Portland, Ore., and remainder of time in Honolulu, since April 1942 with Dept. Engr. Office, Hawaiian Dept. as 2d Lieut. and 1st Lieut., Corps of Engrs.

Warfield, William Fitts, Trinidad, B.W.I. (Age 30) (Claims RCA 5.7) Jan. 1942 to date Field Engr., Navy Archts. & Engrs., Trinidad; previously with Eng. Dept., The Texas Co., Ft. Worth, Tex.; Texas Highway Dept., Austin, Tex., Liberty (Tex.) County Highway Dept.

Williams, Gordon Lee (Junior), Benton, Tenn. (Age 31) (Claims RCA 3.7) Jan. 1942 to date Associate Field Engr., TVA, Ocoee Dam No. 3, Ducktown, Tenn.; previously with U.S. Bureau of Reclamation.

Willis, James Raymond, Mangum, Okla. (Age 37) (Claims RCA 16.3) Sept. 1938 to date Cons. Engr.; previously City Mgr. and City Engr., Mangum, Okla.

APPLYING FOR JUNIOR

Allen, Austin Douglas, Provo, Utah. (Age 28) (Claims RCA 0.6) April to June 1942 Asst. Engr., and June 1942 to date Associate Engr., Utah-Pomeroy-Morrison, Contrs. for Columbia Steel Co.; previously with U.S. Bureau of Reclamation.

Balala, Ben, Sacramento, Calif. (Age 31) (Claims RCA 2.3) Nov. 1933 to date with California Div. of Highways, as Under Eng. Aide, Jun. Highway Engr., Jun. Bridge Engr., and (since July 1942) Asst. Bridge Engr., Bridge Dept.

Christinson, Kenneth Marius, Portland, Ore. (Age 29) (Claims RCM 4.1) Oct. 1933 to date with U.S. Army Engrs. in various capacities, and (since Oct. 1938) Eng. Aide to Asst. Engr., Portland Dist., at present Associate Engr.

Croxatto, Carlos, Santiago, Chile. (Age 27) (Claims RCA 2.0) Feb. 1938–July 1939 and Sept. 1940 to date Design Engr., Reclamation Service of Chile; in the interim with Industrial Dept., W. R. Grace and Co., New York.

Doolittle, Russell Comber, Jr., Des Moines, Iowa. (Age 26) March 1942 to date Inspector, Mason & Hanger Co., on construction of Badger Ordnance Works, Baraboo, Wis.; previously Engr., W. A. Klinger, Inc.; Inspector, Smith, Hinchman & Grylls, Inc., & Howard R. Greene Co., etc.

Gillenwaters, Franklin George, Sacramento, Calif. (Age 32) Aug. 1931 to date with Bridge Dept., California Div. of Highways as Jun. and Senior Eng. Aid, Jun. Highway Engr. and (past year) Jun. Bridge Engr.

Hanson, Walter Edmund, Urbana, Ill. (Age 26) (Claims RCA 0.2) Feb.–May 1942 and Sept. 1942 to date Instructor, Univ. of Illinois; previously with Howard, Needles, Tammen & Bergendoff, Kansas City, Mo.

Jones, Chester Warren, Cincinnati, Ohio. (Age 29) June 1942 to date Asst. Engr. (Civil), U.S. Engrs., War Dept.; previously Asst. Project Engr., Indiana Highway Comm.

Ovalle, Enrique, Santiago, Chile. (Age 27) (Claims RCA 1.0) Nov. 1941 to date Design Engr., Direccion General de Obras Publicas, Departmento de Riego, Rapel power plant; previously Elec. Engr., International Machinery Co.; Testman, Gen. Elec. Co., Schenectady, N.Y.

Ray, Claude Harlan, San Francisco, Calif. (Age 29) (Claims RCA 0.3) June 1936 to date with California Div. of Highways in various capacities, since June 1942 Asst. Highway Engr. (with duties of Asst. Res. Engr.).

Thomas, Keith Dunlap, Sacramento, Calif. (Age 30) (Claims RCA 5.3) June 1941 to date Engr.-Salesman, California Corrugated Culvert Co., Berkeley, Calif.; previously Asst. Engr., Chas. H. Widdows, Civ. Engr., Stockton, Calif.

Zollman, Charles Clement, New York City. (Age 27) Jan. 1942 to date Draftsman (Structural), Anaconda Copper Mining Co.; previously with Interstate Equipment Corporation, Elizabeth, N.J.; with Ministry of Communications, Belgian Govt.

1941 GRADUATE

MO. SCHOOL OF MINES & MET.
(B.S. in Civ. Eng.)

	Age
Livingston, Kermit Fink	(28)

1942 GRADUATES

ALA. POL. INST.
(B.C.E.)

Wilborn, Clellie Edward, Jr.	(23)

UNIV. OF COLO.
(B.S. in C.E.)

Pasma, Richard Thomas	(22)

UNIV. OF CONN.
(B.S.)

Forsyth, Leon Ernest	(21)

IOWA STATE COLL.
(B.S.)

Ormsby, Everett Joseph	(21)
Rockey, Buell E.	(26)

UNIV. OF IOWA
(B.S. in C.E.)

Trygg, Charles Everett	(21)

MICH. COLL. OF MINING & TECH.
(B.S. in Civ. Eng.)

Jahnke, David Harold	(22)

UNIV. OF N.DAK.
(B.S. in Civ. Eng.)

Malley, Vernon Francis	(22)

NORTHEASTERN UNIV.
(B.S.)

Hankinson, George William	(27)

UNIV. OF TENN.
(B.S. in Civ. Eng.)

Barker, Lawrence Spears, Jr.	(22)
Dougherty, Edward Monteith	(21)

AGRI. & MECH. COLL. OF TEX.
(B.S. in C.E.)

Peterson, William Morrison	(22)

UNIV. OF TEX.
(B.S. in C.E.)

Fraim, Raymond Albert, Jr.	(22)
Newman, James Blackstone	(20)
Schindler, Arnold Lee	(23)
Short, Harry Hammond	(21)
Weise, Jesse William	(27)

VA. MIL. INST.
(B.S. in Civ. Eng.)

Hirst, Julian Fravel	(21

APPLYING FOR AFFILIATE

Vickery, Charles Watson, Jr., Washington, D.C. (Age 36) (Claims RCM 5.5) Sept. 1941 to date Associate Statistician, PRA; previously Chf. Statistician, Texas Highway Planning Survey, Austin, Tex.

The Board of Direction will consider the applications in this list not less than thirty days after the date of issue.

WPB ORDERS WELDING

TO CONSERVE STRUCTURAL STEEL

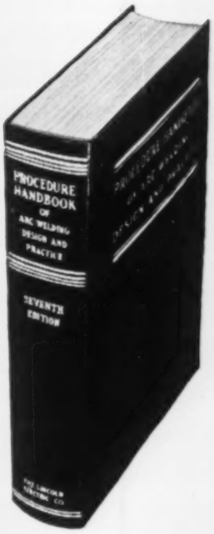
ONE of the provisions of the new ruling of the War Production Board requires the person responsible for the design of a steel building to certify that the new specifications have been complied with, and that "the building has been designed to secure the greatest savings of steel practical through continuity in design and welded fabrication." The new specifications, established September 10th, become mandatory on November 9, 1942, but all agencies are empowered to put them into effect immediately, wherever possible. Emergency specifications complying with the W P B ruling are available at American Institute of Steel Construction, 101 Park Ave., New York, N. Y. (Price 25c).

HERE IS STRUCTURAL WELDING INFORMATION

to guide you in complying with WPB national emergency specifications for design, fabrication and erection of structural steel for buildings.

The "Bible" on Arc Welding—New 1308-Page "Procedure Handbook." Contains 282 pages on all phases of structural design—columns, beams, girders, trusses, rigid frames—plus chapters on welding technique, procedures, speeds, costs, testing and application studies. 1810 illustrations. Price $1.50 postpaid in U.S.; $2.00 elsewhere. Mail the coupon to Lincoln.

Studies in Structural Arc Welding. Issued periodically. Gives pertinent information on various aspects of structural welded design. Next study discusses anchor attachments to column bases. Free to engineers and designers. Mail the coupon to Lincoln.



THE
LINCOLN ELECTRIC
COMPANY
CLEVELAND, OHIO

MAIL THE COUPON FOR WELDING INFORMATION

THE LINCOLN ELECTRIC COMPANY, Dept. CE, Cleveland, O.

☐ Rush me postpaid........copies of the New Procedure Handbook of Arc Welding Design and Practice. ($1.50 in U.S.; $2.00 elsewhere). Am enclosing $............

☐ Mail me free copy of Studies in Structural Arc Welding as issued.

Name ____________________

Position ____________________

Company ____________________

Address ____________________

City ____________ State ____________

Engineering Societies Personnel Service, Inc.

NEW YORK
31 W. 39TH ST.

CHICAGO
211 W. WACKER

DETROIT
FARNSWORTH AVE.

SAN FRANCISCO
57 POST ST.

BOSTON
4 PARK STREET

The items listed below have been furnished by the Engineering Societies Personnel Service, Inc., which is under the joint management of the Four Founder Societies. This service is available to members and is operated on a cooperative, non-profit basis. In applying for positions advertised by the Service the applicant agrees, if actually placed in a position through the Service as a result of these advertisements, to pay a placement fee in accordance with the rates as listed by the Service. These rates have been established in order to maintain an efficient, non-profit personnel service and are available upon request. This also applies to registrants whose notices are placed in these columns. All replies should be addressed to the key numbers indicated and mailed to the New York Office.

A weekly bulletin of engineering positions open is available to members of the cooperating societies at a subscription of $3 per quarter or $10 per annum, payable in advance.

MEN AVAILABLE

GENERAL SUPERINTENDENT OR CHIEF ENGINEER; Assoc. M. Am. Soc. C.E.; U.S. citizen; graduate civil engineer; over 25 years' experience in responsible directive capacities on work of magnitude here and abroad, inclusive of tropical countries. Accustomed to both design and construction. Organized and executed projects of difficult varied construction for both governmental and private interests. Work included most all lines. Record of accomplishment Will be available October 1st. C-942.

LAND SURVEYOR, TRANSITMAN; 12 years' experience in general land surveying and building layout; highway work and mapping. C-943.

CIVIL ENGINEER; Jun. Am. Soc. C.E.; 28; married; B.S. in C.E. from Colorado State College, 1941; would like position pertaining to either hydraulics or structural work, or in teaching where it would be possible to take more work in hydraulics; 6 years' experience with irrigation company as reservoir caretaker previous to completion of college work; available immediately. C-944.

GRADUATE ENGINEER; Assoc. M. Am. Soc. C.E.; 15 years' experience with general contractor on office building and hospital construction. Now employed in maintenance department of large institution as chief engineer's assistant and cost accountant. Wishes to return to construction work with contractor, architect, or bank where building experience would be used. C-945.

POSITIONS AVAILABLE

RESIDENT AND CONSTRUCTION ENGINEERS, 30–35, who have had considerable experience on highway construction, drainage, excavation, etc. Will be required to assist construction superintendent in making reports, etc. Salary, about $6,000 a year. Duration, 6 to 10 months. Location, South America. W-291.

STRUCTURAL DESIGNER AND STRUCTURAL DRAFTSMAN. Should have had 6 years' experience in mill building design. Salary, $3,120 a year, plus overtime. Location, New York, N.Y. W-661.

SURVEYOR who has had considerable experience in the field and who is capable of accepting the responsibility of line, grade, and layout for a water supply system. Location, East. W-854.

SAFETY ENGINEER, either mechanical, electrical, civil, or chemical engineering graduate. Must have experience in heavy industry. Salary, $3,600–$4,200 a year. Location, Mississippi. W-867.

FIELD ENGINEER experienced in industrial plant construction, both building and mechanical equipment. Must be able to interpret drawings and designs and layout work in the field. Salary, $3,900 a year. Headquarters, Ohio. W-1025.

CONSTRUCTION ENGINEER to do field layout, interpretation of plans and supervision. Duration, 3 to 4 months, with possibility of being transferred to other projects upon completion of work. Salary, $4,056 a year. Location, Ohio. W-1143.

COMMISSIONS. Civil Engineers for officer candidates in the United States Army. Must be 30–59 years of age. Must have had at least 5 years' experience supervising the construction of highways, airports, or dirt removal, that is, drainage, leveling, etc. Location, anywhere. W-1199.

PROFESSOR, either civil or mechanical engineer. Excellent opportunity. Apply by wire, giving qualifications and professional record in brief. Location, Pennsylvania. W-1210.

CONSTRUCTION SUPERINTENDENT with at least 10 years' experience. Should have had some experience in shoring and underpinning of buildings. Must be acquainted with the use of jack piles and other appliances used in this type of work. Salary, $3,600–$4,200 a year. Location, New York, N.Y. W-1214.

ENGINEERS. (*a*) Civil Engineering Draftsmen. (*b*) Civil Engineer, first-class soil analysis man to interpret soil analyses, take charge of sampling, and design sub-base for runways and highways based on results thereof. Location Maryland. W-1220.

DESIGNERS who have had some experience on reinforced concrete industrial building design Temporary. Salary, $3,640–$4,680 a year Location, Pennsylvania. W-1244.

SEWAGE DISPOSAL OPERATORS and Filtration Water Treatment Plant Operators. Salary open. Location, New York State. W-1266.

CIVIL ENGINEERS, executive experienced in sewers, water works, and roads. Must have good general background as an executive in a consulting or contracting firm. Salary open Location, New York, N.Y. W-1276.

ENGINEER, graduate civil or mechanical, preferably with experience in testing of materials Should be draft exempt or married with children Will be assistant to the head of materials testing laboratory and would have others working for him. Would be required to write reports covering work done. Location, New Jersey. W-1294

OFFICE ENGINEER experienced in steel and concrete design, and, preferably some piping Knowledge of water supply desirable. Salary $4,500–$4,800 a year. Location, Kentucky W-1301.

CIVIL ENGINEERS who have had previous experience in European railroad work. Either field construction or report work experience will be acceptable. Salary open. Location, New York, N.Y. W-1302.

RECENT BOOKS

New books of interest to Civil Engineers donated by the publishers and filed in the Engineering Societies Library, or in the Society's Reading Room, will be found listed here. The notes regarding the books are taken from the books themselves and are edited by members of the staff of the Society or of the Library. Those books which are in the Library may be borrowed by mail by Society members for a small handling charge.

AMERICAN HIGHWAY PRACTICE, Vol. 2. By L. I. Hewes. John Wiley & Sons, New York; Chapman & Hall, London, 1942. 492 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, $6.

The second volume of this treatise is devoted to pavements of asphalt, concrete, and brick. Penetration macadam, sheet asphalt, asphaltic concrete, cement concrete, and brick roads are treated comprehensively, with some attention to their origins and historical development, and full information on current American practice. The design of cement-concrete pavement mixtures and concrete road slabs is given special attention, and a chapter is devoted to small bridges, culverts, guard rails, etc. Each chapter has a bibliography.

BLUEPRINT READING AND SKETCHING (Pennsylvania State College Industrial Series), 2 ed. By H. S. Thayer. McGraw-Hill Book Company, New York and London, 1942. 135 pp., illus., with blueprints, 9×6 in., cloth, $2.25.

Much of the text has been revised for this edition, and two new chapters on orthographic projection have been added. The large prints, in the pocket attached to the back cover, are reproduced in scales common to industrial drawing, making them an improvement over those in the first edition. Shop terms and the language of production are used throughout.

Great Britain. Department of Scientific and Industrial Research. BUILDING RESEARCH, WARTIME BUILDING BULLETIN No. 21. Notes on the Repair of Bomb-Damaged Houses. His Majesty's Stationery Office, London, 1942. 21 pp., illus., diagrs., tables, $11 \times 8^1/_2$ in., paper, 1 s. (Obtainable from British Library of Information, 30 Rockefeller Plaza, New York, 30 cents.)

This bulletin is designed to assist the expert to decide what to do to a damaged building. It gives data on the strength of damaged walls and general suggestions on various repair problems, including the treatment of dry rot and the interior finishing of repaired structures.

MANUAL OF MOMENT DESIGN. By J. Singleton. American Institute of Steel Construction, New York; H. M. Ives & Sons, Topeka, Kans., 1941. 146 pp., illus., diagrs., charts, tables, 10×7 in., fabrikoid, $4.

This book is intended to provide the designer with a ready method of calculating the bending moments in prismatic continuous beams and frames, and to eliminate much of the drudgery of computation. It is assumed that the writer is conversant with the theory of continuity.

MATHEMATICS OF MODERN ENGINEERING, Vol. 2 (Mathematical Engineering). By E. G. Keller. John Wiley & Sons, New York; Chapman & Hall, London, 1942. 309 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, $4.

The three-volume work, of which this is the second volume, aims to present those aspects of mathematics which the experience of a large manufacturing organization has found to be of greatest value to engineers. This volume contains an explanation and elaboration of the fundamental method of mathematical engineering, which includes the reduction of physical phenomena to a mathematical system and the solution of that system.

National Research Council HIGHWAY RESEARCH BOARD, PROCEEDINGS of the Twenty-First Annual Meeting, held at Johns Hopkins University, Baltimore, Md., Dec. 2–5, 1941. National Research Council, Washington, D.C., 1942. 561 pp., illus., diagrs., charts, tables, maps, $10 \times 6^1/_2$ in., cloth, $3.25.

These Proceedings bring together the records of the important investigations of highway problems carried out during the past year, as reported by various committees of the Board. Questions of finance, economics, design, materials, construction, maintenance, traffic, safety, and soils are discussed by engineers of wide experience.

STRENGTH AND PROPERTIES OF MATERIALS (Rochester Technical Series.) By J. Elberfeld. Harper & Brothers, New York and London 1942. 150 pp., illus., diagrs., charts, tables, $9^1/_2 \times 6$ in., cloth, $1.75.

This textbook aims to present, in one small volume, the essential information on materials needed by those engaged in the various industries, and is intended as preparation for courses in tool, machine, and structural design. Only elementary mathematical knowledge is necessary.

WATER HANDBOOK, CHEMICAL ANALYSES AND INTERPRETATIONS. Published by W. H. and L. D. Betz, Frankford (Philadelphia, Pa.). 1942. 64 pp., illus., diagrs., charts, tables $11 \times 8^1/_2$ in., paper, spiral binding, 50 cents.

The first part of this handbook gives clear, definite directions for water analysis, covering all the tests commonly used in industrial plant control and presenting simple methods which do not require previous chemical experience. The second part discusses the interpretation of the tests and their application to plant control.

WELDING HANDBOOK. American Welding Society, New York, 1942 ed. 1593 pp., illus., diagrs., charts, tables, 9×6 in., cloth, $6 in the United States; $6.50 in foreign countries, $5 to members.

The aim in preparing this work has been to give engineers an authoritative, up-to-date reference book on the technical phase of welding The physics and metallurgy of welding, the weldability of steels, welding processes, brazing, soldering, facing, metal spraying, metal cutting metals used, training, inspection, safety, design and testing of welds, and applications are discussed. Each topic is treated by a committee of experts.

MEMO

For Every Construction Job — foundations, bridges, wharves and other timber projects use —

AMCRECO

Creasoted

PILES and TIMBER

LONG LIFE • ECONOMY • RELIABILITY

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY
INCORPORATED

AMCRECO
LOWRY PROCESS CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY
INCORPORATED

ADDRESS INQUIRIES TO CHICAGO, ILL., OR LOUISVILLE, KY.

CURRENT PERIODICAL LITERATURE

Abstracts of Articles on Civil Engineering Subjects from Publications (Except Those of the American Society of Civil Engineers) in this Country and Foreign Lands

Selected items for the current Civil Engineering Group of the Engineering Index Service, 29 West 39th Street, New York, N.Y. Every article indexed is on file in The Engineering Societies Library, one of the leading technical libraries of the world. Some 2,000 technical publications from 40 countries in 20 languages are received by the Library and are read, abstracted, and indexed by trained engineers. With the information given in the items which follow, you may obtain the articles from your own file, from your local library, direct from the publisher, or they may be borrowed from the Engineering Societies Library. Photoprints will be supplied by this library at the cost of reproduction, 25 cents per page to members of the Founder Societies (30 cents to all others), plus postage, or technical translations of the complete text may be obtained at cost.

BRIDGES

Cantilever. Cantilever Girders Preferred, C. H. Wood. *Eng. News-Rec.*, vol. 129, no. 7, Aug. 13, 1942, p. 235. Advantages of cantilever girders pointed out, stressing the fact that bending moments at piers and in spans can be equalized or given any desired relation; comparison of maximum moments in continuous and cantilever 3-span bridges.

Concrete. Staging and Shuttering for Reinforced Concrete Bridges, W. A. Fairhurst. *Concrete & Constr. Eng.*, vol. 37, no. 8, Aug. 1942, pp. 283–298, 2 supp. plates. Terms shuttering, staging, and centering are defined; only aspects of problem of shuttering and staging that have special application to bridge design and matters that have so far received little consideration are dealt with; methods of dealing with problems are detailed and illustrated, and specific examples given.

Concrete Arch. Highway Arch Bridge of Plain Concrete Is Wholly Without Steel. *Concrete*, vol. 50, no. 8, Aug. 1942, pp. 5–6. Drawings of unreinforced concrete arch bridge design, which solved problem of critical materials for Indiana State Highway Department.

Concrete, Louisiana. Highway Crossing, Morganza Floodway, Louisiana, N. W. Lant. *Roads & Streets*, vol. 85, no. 8, Aug. 1942, pp. 29–34. General features of project described; approved plans call for reinforced-concrete pile trestle structure consisting of four hundred and fifty-eight 41-ft concrete deck girder spans having 50-ft clear roadway, $2^1/_2$-ft walkway on each side and center dividing curb; girder spans are supported on pre-cast reinforced-concrete pile bents, number of piles per bent being five, six, or seven, depending on resistance encountered.

Construction. Sand Fill Reduces Weight of Bridge Pier. *Eng. News-Rec.*, vol. 129, no. 9, Aug. 27, 1942, pp. 296–298. Dead weight of one of piers for new Mississippi River Bridge at Dubuque, Iowa, was reduced 1,120 tons by making central portion of base sand fill; reduction in cost also was achieved because of large amount of concrete eliminated; pier was built by sinking wooden crib within which vertical concrete wall 9 ft thick was placed by tremie to confine sand fill.

Construction Standards. Building Standardized Bridges for County, J. F. Mollenkopf. *Pub. Works*, vol. 73, no. 7, July 1942, pp. 25–27. By making standard plans applicable to any small concrete bridge or culvert, plan for given culvert could be made in two hours by filling in variable dimensions; construction of short-span bridges in Van Wert County, Ohio, through winter of zero weather, described.

Highway, New Brunswick. Recent Highway Bridge Construction in New Brunswick, R. A. Malloy. *Eng. & Contract. Rec.*, vol. 55, no. 35, Sept. 2, 1942, pp. 10–12. New creosoted wood-truss structure erected at mouth of Nepisiguit River on existing granite piers; other interesting highway bridges include stone-faced arch and Burr truss design; two new projects recently awarded.

Railroad, Demolition. Big Bridge Brought Down in One Operation. *Ry. Eng. & Maintenance*, vol. 38, no. 8, Aug. 1942, p. 547. Railroad bridge located near Springbrook, Pa., dismantled as result of line abandonment, was demolished and scrapped in connection with retirement of portion of Wilkes-Barre & Eastern line, 62 miles long, that extended from point near Wilkes-Barre, Pa., southeasterly through Pocono mountains to Stroudsburg, Pa.; procedure followed in dismantling bridge.

Railroad, Temporary. Steel Bents Are Different in These Temporary Bridges. *Ry. Age*, vol. 113, no. 4, July 25, 1942, pp. 136–138 and 141. Innovation in design of falsework bents—constructed of H-section piles, developed and used by Pennsylvania Railroad on temporary bridges carrying traffic during building of highway subways—is described.

Suspension, British Columbia. Lions' Gate Bridge, S. R. Banks. *Eng. J.*, vol. 25, nos. 4, 5, 6, and 7, Apr. 1942, pp. 210–222; May, pp. 282–297; June, pp. 347–360; and July, pp. 414–428. Design and fabrication of privately owned bridge crossing the Narrows at entrance to Vancouver Harbor.

BUILDINGS

Air-Raid Precautions, Shelters. Strengthening Basements for Air Raid Protection. *Eng. & Contract. Rec.*, vol. 55, no. 32, Aug. 12, 1942, pp. 16–18. Suggestions for strengthening cellars to be used for air-raid shelters in Canada; strengthening of ceiling supports and walls; splicing of beams or joists.

Bombing Effect. Bomb Defense, A. M. Prentiss. *Army Ordnance*, vol. 23, no. 133, July-Aug. 1942, pp. 54–58. Engineering aspects of protective construction; description and properties of demolition, general purpose, fragmentation, and fire bombs and types of damage that each may cause; loads exerted on structures by bombs and protective construction which is claimed adequate for buildings and personnel.

Camps, Internment. Alien Camp Built in 23 Days. *Eng. News-Rec.*, vol. 129, no. 11, Sept. 10, 1942, pp. 358–359. Nashville District, U.S. Engineers, has completed alien concentration camp in 23 days; most of buildings are wood-frame, 5-man "hutments," but large number of 15-man, wood-frame barracks was required; construction of mess halls, latrines, bathhouses, and streets is also described.

Underpinning. Arbeitsverfahren bei der Unterfangung von Gebaeuden, H. Press. *Bauingenieur*, vol. 22, no. 11/12, Mar. 20, 1941, pp. 97–101. Method employed in underpinning of buildings, in connection with tunnel driving for building of deep cellars under existing buildings and in construction of tunnels and subways in city sections.

CITY AND REGIONAL PLANNING

National Defense, Cities and Towns. English Cities Organize to Meet Bombing Damage. *American City*, vol. 57, no. 7, July 1942, pp. 46–48. Article prepared by British Library of Information as aid to every American municipality faced with possibility of same problems; damage to roads; repair of water mains and other utilities; advantages of permanent rather than temporary restoration; filling, surfacing, and bridging bomb craters.

Post-War. Planning—National, Regional, and Local, G. S. Barry and A. M. Rosie. *Instn. Mun. & County Engrs.—J.*, vol. 68, no. 12, May 26, 1942, pp. 361–367. Author points out disadvantages of post-war construction era following first World War due to lack of coordinated planning and urges that future reconstruction in England be based on carefully prepared plans. Before Instn. Mun. & County Engrs.

United States. Handbook on Urban Redevelopment for Cities in United States. *Federal Housing Administration*, Wash., D.C., Nov. 1941, 105 pp., 15 cents. Suggesting certain powers and procedures and integrated long-term program for dealing with slums and blighted urban areas.

CONRETE

Construction, Cooling. Cooling 20,000,000 Tons of Concrete, L. J. Snyder. *Water Works Eng.*, vol. 95, no. 8, Apr. 22, 1942, pp. 408-411. Description given of cooling operations for placing concrete in Grand Coulee Dam; to cool concrete, 2,000 miles of 1-in. pipe had to be embedded in concrete and cold water pumped through these pipes until concrete had set and been cooled to its normal temperature. From *Reclamation Era*, November 1941.

Creep. Effect of Change in Moisture-Content of Creep of Concrete Under Sustained Load, G. Pickett. *Am. Concrete Inst.—J.*, vol. 13, no. 4, Feb. 1942, pp. 333–355. Amount and rate of plastic flow in concrete under load have been found to depend upon rate of drying; mathematical analysis shows that this is natural consequence of non-uniform shrinkage and non-linear stress creep relationship; it is further shown that shrinkage cannot account for additional creep unless inelastic strain not proportional to stress is produced; results from experiments reported.

Floors. Reinforced Concrete Creates Second Floor Within Old Industrial Building. *Concrete*, vol. 50, no. 6, June 1942, pp. 2–3. Construction of intermediate floor in existing mill building of old type, provides excellent illustration of potential floor space available in many buildings, now remaining unused; form work for floor construction was built with plywood sheathing; placing of structural concrete was accomplished by means of concrete pump; ready-mixed concrete used.

Mixing. Method for Proportioning Concrete for Compressive Strength, Durability, and Workability, A. T. Goldbeck and J. E. Gray. *Crushed Stone J.*, vol. 17, no. 3, May–June 1942, pp. 3–10 and 20. Adequate but not extravagant compressive strength, workability, and durability are important qualities of most concrete; simple method of proportioning that will produce desired quality of concrete, irrespective of type or gradation of aggregates, is presented; it is founded on research, is easy to use, and is dependable and practical.

Retaining Walls. Design of Concrete Retaining Walls—II, O. Albert. *Concrete*, vol. 50, no. 6, June 1942, pp. 33–36. Calculation of pressure against back of wall; method of calculation of earth pressure behind retaining walls is presented as preliminary of subject of design of concrete walls of this type, and in continuation of author's four articles, "Essentials of Reinforced Concrete Design," printed in issues from January to April 1942.

DAMS

Concrete Gravity, Great Britain. Concrete Dam, C. F. Lapworth. *Water & Water Eng.*, vol. 45, no. 554, July 1942, pp. 3–8. Illustrated description of dam designed to carry maximum pressure of 3.7 tons per sq ft; dam is curved in plan, having radius of 500 ft to upstream face; curvature increases length of dam at top by only $1^1/_2$%; construction features.

Earth Fill, California. Rolled-Fill Methods at Sepulveda Dam, J. G. Morgan. *Eng. News-Rec.*, vol. 129, no. 5, July 30, 1942, pp. 170–172. Building dam for Los Angeles flood control; procedures used to increase construction speed and to give well-compacted embankment; long hauls were made with 13-yd rubber-tired wagons traveling 20 mph; two 8-hour shifts were worked; water-filled holes were emptied by crowding water out with earthfill; fastest progress was made with borrow material below optimum moisture content; maximum density was obtained when 6-in. lifts were not exceeded even by small amounts.

Hydraulic Gates. Some Types of Modern Sluice Gates, P. L. Boucher. *Civ. Eng.* (London), vol. 37, no. 430, Apr. 1942, pp. 72–75. Purpose of article is to give brief résumé of modern sluice gate practice, and to indicate trend towards automatic operation, especially of installations having relatively complex requirements of flow control.

Pipe Lines, Welding. Pipes for Grand Coulee. *Welding Engr.*, vol. 27, no. 8, Aug. 1942, pp. 32–33. Details of combination of various processes of oxy-acetylene cutting, arc-welding, flame gouging, and flame cleaning in pipe fabrication of Grand Coulee Dam.

FLOOD CONTROL

Houston, Tex. Three Dams to End Houston Floods. *Eng. News-Rec.*, vol. 129, no. 7, Aug.

HELP THE WAR EFFORT ... AND YOURSELF

HERE'S HOW!

- Estimate your future asphalt needs accurately.

- Let contracts for only the amount you will use.
- Release, *now*, any asphalt held for you by your supplier which you cannot use.

- Anticipate delivery schedules as closely as possible

UNLOAD TANK CARS PROMPTLY . . . "KEEP THEM ROLLING"

HERE'S WHY!

● The need for airports, cantonment streets, and highway construction and maintenance make asphalt a vitally important material to the war effort.

So far there has been no serious asphalt shortage generally. But in some instances work has been delayed on vital war jobs because asphalt could not be made immediately available. Stocks in suppliers' hands were held under contract. In many instances the municipal, state, or county department with which these contracts were made had greatly over-estimated its needs. Time was consumed in finding this surplus asphalt and getting releases for it.

Read the suggestions at the top again. When you contract for 1943, estimate your asphalt needs accurately so that you will not hold up important war construction jobs. At the same time you will help insure that your own asphalt requirements will be met by your cooperation in this effort.

You'll find the Standard Oil Asphalt representative in your locality eager to work more closely than ever with you on problems of delivery, types of construction, etc. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the representative nearest you.

OIL IS AMMUNITION . . . USE IT WISELY

ASPHALT FOR EVERY PURPOSE

STANDARD OIL COMPANY
(INDIANA)

BROTHER, THIS IS WAR
AVOID MISTAKES!
Arkwright PENCIL CLOTH WHITE
Arkwright PENCIL TRACING CLOTH
Prudence TRACING CLOTH
Matsu PENCIL TRACING CLOTH
Arkwright TRACING CLOTH

Guard precious war drawings with this special-process tracing cloth

Mistakes mean delays, and America's wartime job is to *speed* production! Give war jobs the best! That means specially-processed Arkwright Tracing cloth. Arkwright is made by a highly technical method on costly machines. The surface is clear, smooth – never "humpy." Ink lines won't spread or "feather" – nor crack or chip in drying. Years from now, drawings will be fresh and clear – truly permanent! Guard your war work this way. Arkwright Finishing Company, Providence, R. I.

Arkwright TRACING CLOTHS

AMERICA'S STANDARD FOR OVER 20 YEARS

13, 1942, pp. 239–240. Now under construction is $32,000,000 flood-control program for Houston, Tex.; work includes construction of three earth dams and two canals; in addition 6½ miles of existing Buffalo Bayou, which runs through heart of city, will be improved.

FOUNDATIONS

Bearing Capacity. Soil Pressure Distribution Along Flexible Foundations, A. Bull. *Franklin Inst.—J.*, vol. 233, no. 6, June 1942, pp. 559–580. Approximate mathematical treatment of problem outlined with detailed explanation of basic principles; equations are presented and discussed; negative soil pressures and their effect on yield curves.

Concrete. Wall and Column Footings Without Steel, V. H. Bergman. *Eng. News-Rec.*, vol. 129, no. 3, July 16, 1942, pp. 114–115. Scientific methods for designing plain concrete footings for columns and walls are developed; charts showing step-by-step procedure are presented as aid to rapid work; data are made available for comparing material and labor required in building both plain and reinforced footings.

HYDRAULIC ENGINEERING

Ship Models, Tanks. New Model Basins for U.S. Navy. *Engineer*, vol. 173, nos. 4506, 4507, 4508, 4509, and 4510; May 22, 1942, pp. 422–423; May 29, pp. 440–442; June 5, pp. 462–465; June 12, pp. 487–489; and June 19, pp. 506–510. Illustrated description of David W. Taylor basin, erected at Carderock, Md., by U.S. Navy Dept., at cost of $3,500,000; establishment has group of four basins, each intended to deal with particular division of model towing research.

INDUSTRIAL BUILDINGS

Protection. Invisible Light Used to Fight Sabotage, R. E. Appel. *Water Works & Sewerage*, vol. 89, no. 6, June 1942, p. 260. Explanation of principles of photoelectric guarding; how light sources and receivers are installed; illustrated description of installation pattern for guarding tanks, gate house, well, small reservoir, etc.

LAND RECLAMATION AND DRAINAGE

Airports. Drainage for Airplane Repair Depot. *Eng. News-Rec.*, vol. 129, no. 7, Aug. 13, 1942, pp. 222–223. Installation of drainage facilities in building eastern airbase for repair of army bombers was accomplished by use of 53,850 ft of 8 to 72-in. diameter reinforced concrete pipe; flow from this network is concentrated in one 72-in. diameter outfall; open joints are used for lines paralleling runways, and coarse gravel is employed as backfill.

Relation to Defense Effort. Relation of Drainage to Victory Program of Agriculture, J. G. Sutton. *Agric. Eng.*, vol. 23, no. 8, Aug. 1942, pp. 249–250 and 252. Example of how U.S. Dept. of Agriculture has been working with farmers on drainage problems; comment on drainage program in England. Before Am. Soc. Agric. Engrs.

Roads and Streets. Draining to Prevent Slippage of Road Fill. *Pub. Works*, vol. 73, no. 7, July 1942, pp. 23–24 and 27. Two large dirt and rock fills on Los Gatos-Santa Cruz Highway in California, slipped down and out as a result of underground water; to prevent recurrence, over 4,500 ft of drains were placed under 55,000 cu yd of new fill; manner in which this work was done is described.

Roads and Streets. Wet Subgrades, Their Cause and Cure, H. E. Cotton. *Roads & Streets*, vol. 85, no. 5, May 1942, p. 42. All pavements leak during most of their life and when laid on soils, such as clays and gumbos, provision should be made for escape of water as rapidly as possible; to hasten exit of water, transverse drains are suggested to intercept longitudinal flow; it is also suggested that slope of bottom of these drains be greater than that of surface crown.

Siphons. Corrugated Multi-Plate Siphon. *Civ. Eng.* (London), vol. 37, no. 430, Apr. 1942, p. 79. Description of siphon near Lexington, Nebr., designed to carry 1,500 cu ft per sec flow of Phelps County irrigation canal under bed of Plum Creek.

MUNICIPAL ENGINEERING

El Paso, Tex. El Paso Expands Utilities for Army Use. *Eng. News-Rec.*, vol. 129, no. 5, July 30, 1942, pp. 166–169. Population increase of 40% is mostly military; increase has taxed water and sewage facilities, although it has not created usual traffic and housing problems; more water, to supplement existing well supply, to come from Rio Grande, and treatment plant is under construction; plans for enlarged sewage treatment plant and additional sewers are complete, but construction is held up because of inadequacy of A-2 priority rating.

San Diego, Calif. San Diego Faces 1960's Problems Today. *Eng. News-Rec.*, vol. 129, no. 3, July 16, 1942, pp. 110–113. Engineering studies of future water supply, sewage, and traffic requirements for San Diego, Calif., always assumed population of 350,000 by about 1960; when war created such population by 1942, unprecedented and unexpected problems faced city's engineers; water distribution system had to be enlarged, new supply reservoir built, sewage treatment inaugurated, and traffic facilities improved.

PORTS AND MARITIME STRUCTURES

Rat Eradication. Dockside Rats, E. Hardy. *Dock & Harbour Authority*, vol. 23, no. 259, May 1942, pp. 7–8. Position in wartime; increase of black ship rat; method for elimination of rats; all buildings and ships should be properly rat-proofed.

Shore Protection, New Zealand. Oamaru Foreshore Protection, O. J. Doidge. *New Zealand Inst. Engrs.—Bul. & Proc.*, vol. 27, no. 3, Oct. 15, 1941, pp. 241–259. Protective measures that have been undertaken at Oamaru, New Zealand, to overcome erosion of shore; temporary stonework is being brought up above ground level to form equivalent of parapet; permanent projects are discussed.

ROADS AND STREETS

Bank Protection. Naturalized Road Banks, C. R. Hursh. *Better Roads*, vol. 12, no. 7, July 1942, pp. 17–20. Discussion of drainage as factor in road bank stabilization; construction of stable slopes and protection from freezing and thawing; top dressings; use of mulches.

Design. Design of Highway Sections for War and Post-War Needs, W. H. Simonson. *Roads & Streets*, vol. 85, no. 5, May 1942, pp. 31–36. General classification of rural highway types according to traffic and topography; basic landscape design considered as integral part of economic and safe highway construction and maintenance; future trends.

Expressways, New York City. New York Elevated Superhighway. *Better Roads*, vol. 12, no. 7, July 1942, p. 32. Gowanus improvement in Brooklyn utilizes remodeled structure of former elevated railway on part of route that closes big gap in New York Belt Parkway system.

Highway Systems, Alaska. Alaska Highway, J. M. Wardle. *Eng. J.*, vol. 25, no. 3, Mar. 1942, pp. 136–140. Reasons which justify construction of such highway are reviewed; proposed routes A and B are described and compared.

Intersections. Traffic Segregation Design "Keeps Them Rolling." *Roads & Streets*, vol. 85, no. 5, May 1942, pp. 54, 56, and 58. Segregation design involving acceleration and deceleration strips, directional islands, and traffic-actuated signals developed to relieve bottleneck on East Shore Highway leading to San Francisco–Oakland Bay Bridge.

Maintenance and Repair. Street Maintenance Practices—II and III. *Pub. Works*, vol.

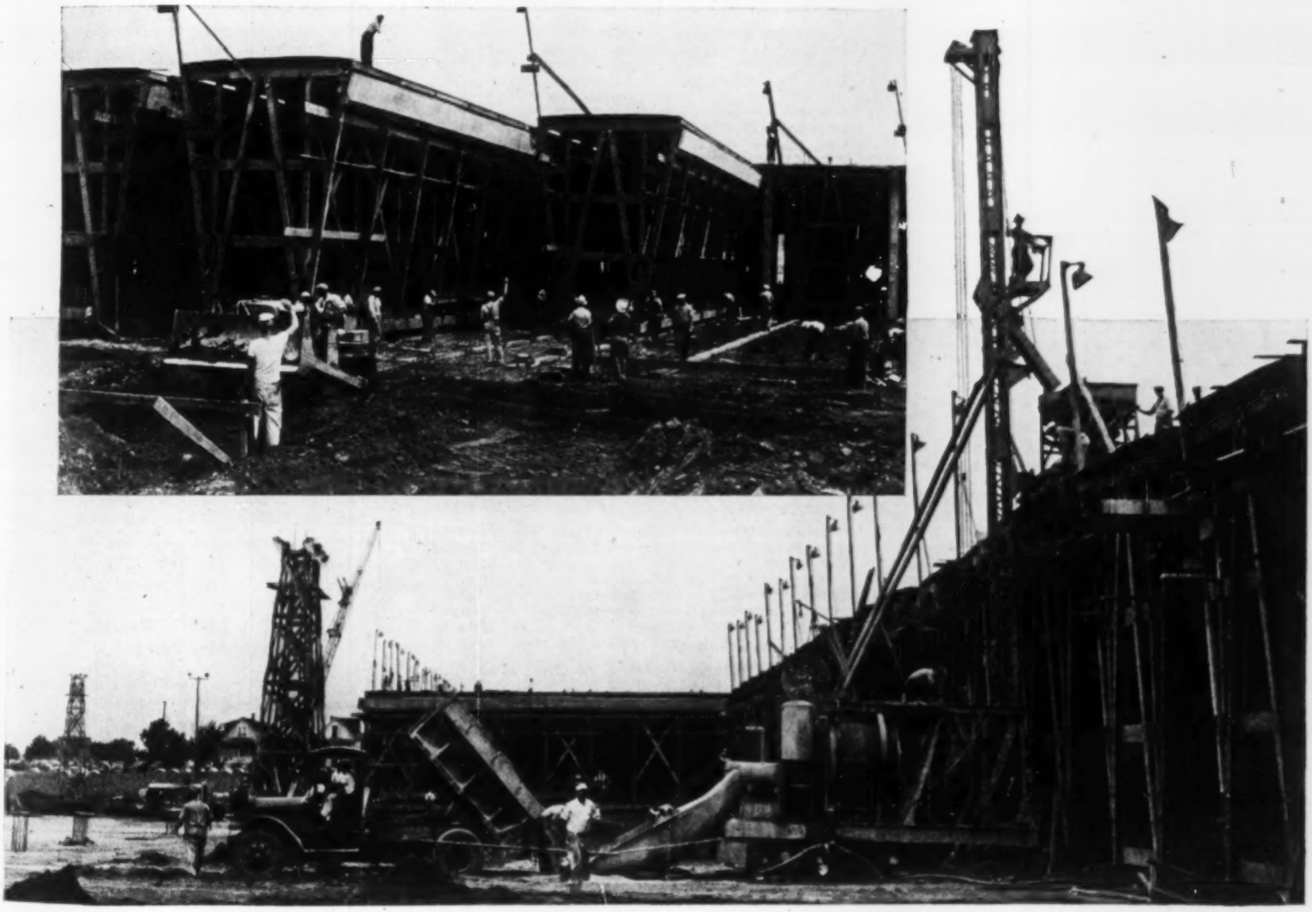
'WARSPEED' WITH 'INCOR'

GIGANTIC WAR PLANT UNDER ROOF IN 49 DAYS

ADD to the outstanding record of American designers and builders this largest one-story reinforced concrete war industry plant . . . acres and acres of vital war production space under roof in 49 days. Result of skillful coordination of design and building methods . . . teamwork between Albert Kahn, Inc., Architects and Engineers, and Mahony-Troast Construction Co., Contractors.

Mahony-Troast planned the job on line-production schedules . . . traveling forms and 'Incor' 24-Hour Cement. Safe stripping without re-posting in 36 to 48 hours . . . high-speed, lumber-saving schedule, with only 10% of total area formed. 69 sets of traveler forms . . . dry-mix trucks from on-the-job batching plant . . . tower pavers on caterpillar tractors . . . up to 6500 cu. yds. superstructure concrete poured in a 6-day week, two 10-hour shifts. Traveler forms rolled into position in less than two minutes . . . forms lined up . . . steel placed . . . concrete poured . . . thoroughly cured with wet cotton mats in 24 to 36 hours . . . then forms unbuckled and moved to new position. Roof slab available at once as work deck . . . no re-posting of completed structure . . . clear space for floor and utility installation. 'Assembly-line' construction . . . war speed with 'Incor' 24-Hour Cement!

TIME WON'T WAIT . . . USE 'INCOR'



LONE STAR CEMENT CORPORATION

Offices: ALBANY · BIRMINGHAM · BOSTON · CHICAGO · DALLAS · HOUSTON · INDIANAPOLIS · JACKSON, MISS.
KANSAS CITY · NEW ORLEANS · NEW YORK · NORFOLK · PHILADELPHIA · ST. LOUIS · WASHINGTON, D. C.

LONE STAR, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS . . 15 MODERN MILLS . . 25-MILLION BARRELS ANNUAL CAPACITY

73, nos. 7 and 8, July 1942, pp. 16–17 and 29–30, and Aug., pp. 25 and 28. Detailed description of method and equipment used by a number of communities in various parts of United States, in patching bituminous and cement concrete pavements.

RAILROAD TRACKS, RECLAMATION. Salvaging Two Thousand Tons of Street Car Rails for War Needs, M. M. Smith. *Pub. Works*, vol. 73, no. 8, Aug. 1942, pp. 11–13 and 22. How village of Grosse Pointe Farms, residential suburb of Detroit, is removing more than 2 miles of double track from its street and restoring street surface to better-than-before condition; village was first community in State of Michigan to attack problem of street car track removal as war salvage measure.

ROAD MACHINERY, WELDED STEEL. Arc Welded Road Scrapers, H. Chase. *American Mach.*, vol. 86, no. 14, July 9, 1942, pp. 706–708. Production and assembly of two heavy types of scrapers manufactured by Gar Wood Industries are outlined; larger part of scrapers is fabricated from $^1/_4$ to $^5/_8$-in. steel plate; materials are assembled into various units by strength, partly to avoid loosening of joints in service and partly to take advantage of economies in manufacture which are realized by arc welding.

ROADSIDE IMPROVEMENT. Economical Landscaping of State Highways, R. S. Green. *Pub. Works*, vol. 73, no. 7, July 1942, pp. 11–12 and 22. In addition to everyday utility and reduction of annual maintenance costs on roadsides, landscaping may offer protective concealment desirable in wartime. Application of this principle may avoid necessity for costly camouflage later. Methods that should be used for economical and efficient roadside improvement of state highways. Before Highway Officials of North Atlantic States.

SNOW AND ICE CONTROLS. Ice Prevention Replaces Ice Removal in New Hampshire. *Pub. Works*, vol. 73, no. 8, Aug. 1942, pp. 33–35. In New Hampshire, winter maintenance is practiced on approximately 2,900 miles of highway; pavements kept free from snow and cost reduced 50% or more by spreading sodium chloride immediately after plowing instead of sanding as previously practiced.

SNOW AND ICE CONTROL. Minnesota's Ice Control System, H. C. Jahnke. *Pub. Works*, vol. 73, no. 8, Aug 1942, pp. 23–24. Highly systemized plan of ice control of District No. 4 of State Highway Dept.; heavily traveled highways are skid-proofed throughout; treated abrasives are stockpiled during fall.

SWAMPS. Road Construction in Swamps Presents Difficulties, G. B. Nicholson. *Oil Weekly*, vol. 106, no. 10, Aug. 10, 1942, pp. 25–26, 28, 30, and 32. Details of road construction practice of Texas Co. in swamps in and adjacent to oil fields in South Louisiana; mat of rough 3 by 12-in. untreated yellow pine boards is laid on marsh; in some cases silt is removed, allowing mat to set on solid clay; creosoted sills or stringers are placed on mat, and layer of cross ties above sills; road surface consists of treads of 3 by 12-in. natural fir plank, with 3 by 6-in. guard rail.

WIDENING. Force Account Concrete Pavement Widening Project. *Roads & Streets*, vol. 85, no. 5, May 1942, pp. 28–30. Force account vs. contract method discussed; experience cited is that of Texas Highway Department in widening and resurfacing 9.25 miles of existing highway.

SEWERAGE AND SEWAGE DISPOSAL

CAMPS, MILITARY. Army Bio-Filter Sewage Plant Provides Unusual Flexibility. *Eng. News-Rec.*, vol. 129, no. 5, July 30, 1942, pp. 173–175. To provide high degree of treatment for sewage from an army camp in which population is expected to vary from 3,500 to 35,000, bio-filtration process was selected, and plant was designed with duplicate units; by means of inter-connections, any or all of units may be operated to produce fixed degree of treatment regardless of flow variations caused by population changes.

CAMPS, MILITARY. Sewage Treatment at Army Posts, L. H. Kessler and J. T. Norgaard. *Sewage Works J.*, vol. 14, no. 4, July 1942, pp. 757–783. Account of work of engineering board in planning sewage treatment plants and in their operation; operating personnel; illustrated description of some plants and operating problems; discussion of operating results, costs, and estimates.

DISPOSAL PLANTS, GARY, IND. Operation of Gary Sewage Treatment Plant in 1941, L. R. Rowson and W. W. Mathews. *Water Works & Sewerage*, vol. 89, no. 6, June 1942, pp. 229–237. General discussion of operating results; plant designed to treat 40 mgd from population of 170,000; article gives particulars of power plant, sludge digestion, aeration tanks, garbage grinding, screening, grit removal, clarification, aeration, gas production, industrial wastes, and administration. Bibliography.

DISPOSAL PLANTS, LABORATORIES. Post War Laboratory Planning and Equipment for Sewage Purification Works, R. W. Covill. *Surveyor*, vol. 101, no. 2614, Feb. 27, 1942, pp. 75–76. Description of laboratory of Carlisle sewage disposal plant, considered excellent example for modern planning, equipped to serve purpose of analytical work (chemical, biological, and bateriological) together with certain facilities for research associated with sewage purification works.

MAINTENANCE AND REPAIR. Sewer Maintenance at Little Rock, T. W. Clapham. *Sewage Works Eng. & Mun. Sanitation*, vol. 13, no. 7, July 1942, pp. 340–342. Sewer maintenance considered chiefly as removal of roots, sand, gravel, rocks, and other foreign matter lodged in system; equipment and methods are described.

OHIO. Fifteenth Annual Report of Ohio Conference on Sewage Treatment, held at Mansfield, Ohio, Sept. 18–19, 1941, *Ohio Conference on Sewage Treatment*, Columbus, Ohio, 1941, 137 pp. Report of following papers and discussions: Development of Sewage Treatment in Ohio, F. H. Waring; Sanitation Problems in National Defense, B. F. Hatch; Cannery Waste Treatment, N. H. Sanborn; Studies of Bathing Beach Waters of Cleveland, P. Van Gieson; Mansfield Sewage Treatment Plant, Design and Operation, J. R. Turner; Revitalized Federation of Sewage Works Associations, W. H. Wisely; Semi-automatic Control of Secondary Solids at Lima Activated Sludge Plant, E. E. Smith; Diffuser Plate Cleaning vs. Compressed Air Costs, W. F. Schade and J. J. Wirts; Flocculation Studies with and Without Chemicals, E. Leist; B.O.D. Dilution Water, Past, Present, and Future, R. D. Scott; Design Problems to Meet Operating Conditions, F. G. Browne; Operating Data with Special Reference to Small Sewage Treatment Plants, G. A. Hall; Improved Sewage Plant Operation at Lakewood, P. A. Williams; Progress Report of Committee on Corrosion, W. F. Schade; Lancaster Sewage Treatment Plant, D. Keller; and Screens and Grit Chambers, D. Heffelfinger.

REFUSE DISPOSAL, WASTE UTILIZATION. Sewage-Sludge and House-Refuse Utilization, C. C. J. Bullough. *Engineering*, vol. 153, no. 3986, June 5, 1942, p. 445. Description of practice which utilizes mixing of two kinds of refuse to form compost which is of great value as manure and fertilizer; system has been in satisfactory operation for some years. Abstract of paper before Inst. Sewage Purification.

SEWAGE ANALYSIS, GREASE DETERMINATION. Grease in Sewage, Sludge, and Scum—III, H. W. Gehm. *Sewage Works J.*, vol. 14, no. 4, July 1942, pp. 799–810. Report on experimental study of separation of grease from sewage by mechanical and chemical methods; effects of settling, temperature, mechanical mixing, aeration, and aero-chlorination on removal of grease from sewage, were investigated and conclusions drawn. Bibliography. See also *Engineering Index*, 1941, p. 1078.

SEWERS, DESIGN. Varied Problems in Design and Construction of Sewers at Lockport, N.Y., W. R. Drury. *Sewage Works J.*, vol. 14, no. 4, July 1942, pp. 784–798. Illustrated description of some of more important and unusual problems that were met and solved; discussion of intercepting sewer design and construction, sewer materials, sewer appurtenances, and principles of design for sewage treatment.

SEWERS, GAS HAZARDS. Control of Odorous and Destructive Gases in Sewers and Treatment Plants, C. O. Hommon. *Water Works & Sewerage*, vol. 89, no. 6, June 1942, pp. 277–280. Dangers of gas or combination of gases in sewers; destructive effects of sulfide gas; methods of preventing sulfide production; oxygen introduction; suppression of bacterial activity; air blowing at plant; chlorination and sulfide fixation as corrective methods.

SEWERS, LINING. Relining of Old Brick Sewer, J. H. Barth. *Pub. Works*, vol. 73, no. 7, July 1942, pp. 21–22. Old two-ring, 40 × 60-in. egg-shaped sewer for La Crosse, Wis., which was nearing collapse, was relined with Armco galvanized corrugated metal pipe, coated with asphalt that contained asbestos, without digging up street; methods and equipment used in this work.

SEWERS, OUTFALL. Study of Infiltration, D. Welch. *Pub. Works*, vol. 73, no. 8, Aug. 1942, pp. 19 and 22. Roof water and infiltration through poor joints in privately laid sewer in Columbia, Mo., was more than ten times dry weather flow; how infiltration points were located and repaired.

WATER POLLUTION, AERATION. Accelerated Reaeration, R. G. Tyler. *Sewage Works J.*, vol. 14, no. 4, July 1942, pp. 834–838. All of commonly accepted methods of disposal attempt to remove or reduce oxygen demand of waste liquor so as to make corresponding reduction in oxygen depletion of receiving waters; an opposite approach would be to permit this depletion to occur through natural biochemical process taking place in receiving waters and then bring dissolved oxygen content of water up to any desired requirement by artificial aeration.

WATER POLLUTION. Study of Pollution and Natural Purification of Scioto River. *U.S. Public Health Service—Public Health Bul. No. 276*, Washington, D.C., 1941, 153 pp., illus., charts, maps., 20 cents. Results of hydrometric, bacteriological, chemical, plankton, and bottom sediment studies made of Scioto River for 115 river miles below Columbus, Ohio, during 30-month period, involving three types of sewage treat-

Great Jumping JEEPS!

MEET THE ARMY'S MECHANICAL MULE . . .

The Jeep—our Army's mechanical mule, has achieved a reputation of out-climbing, out-pulling and out-maneuvering anything of its weight ever put on four wheels. On every war front in the world, the Jeep is now the pride and joy of Brass Hats and Buck Privates alike.

But remember the men who build the Jeeps—those who train to operate and follow them—and the millions of others who are engaged in our war effort. For all, there had to be an abundance of water. It was the Layne Organization, who in the majority of cases, drilled the wells and built the systems that provide water by the millions of gallons. To a well water system, the name Layne is as famed as is the name Jeep to a four wheel vehicle.

Layne's reputation like that of the Jeep has been won on the field of action. Throughout the entire Nation, Layne wells and pumps are doing a magnificent job—providing water for ordnance plants, munition factories, training camps, air fields, ship yards and all kinds of war material producers. For late bulletins, address,

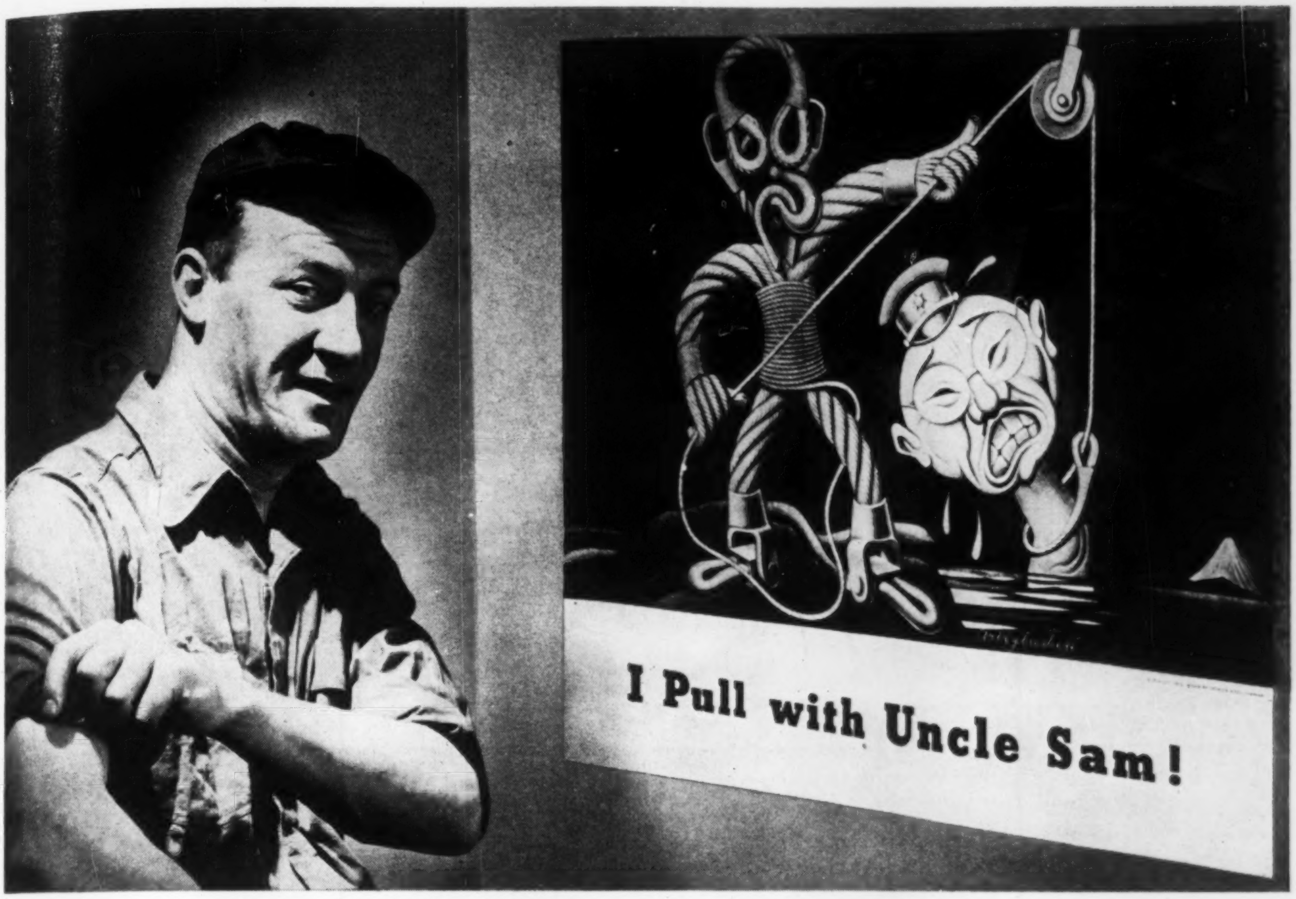
LAYNE & BOWLER, INC.
Memphis, Tenn.

LAYNE
PUMPS & WELL WATER SYSTEMS

Affiliated Companies

Layne-Arkansas Company............Stuttgart, Ark.
Layne-Atlantic Company..................Norfolk, Va.
Layne-Bowler New England Corp...Boston, Mass.
Layne-Central Company..............Memphis, Tenn.
Layne-Northern Company..........Mishawaka, Ind.
Layne-Louisiana Company......Lake Charles, La.
Louisiana Well Company................Monroe, La.
Layne-New York Company..........New York City
Layne-Northwest Company......Milwaukee, Wis.
Layne-Ohio Company..................Columbus, Ohio
Layne-Texas Company..............Houston, Texas.
Layne-Western Company..........Kansas City, Mo.
Layne-Western Co. of Minn.....Minneapolis, Minn.
International Water Supply, Ltd...London, Ont.

WORLD'S LARGEST WATER DEVELOPERS


Artzybasheff
I Pull with Uncle Sam!

FREE WAR POSTERS

Since the present series of war poster illustrations started to appear in Wickwire Spencer advertising, requests for them have been pouring in from every part of the country. Because of this wide-spread enthusiasm, the popular poster shown above has now been reprinted with the title which won first prize in a 4-state contest among war-workers. It symbolizes to workmen America's war-*production* spirit.

The painting is by the famous artist, Boris Artzybasheff, whose illustrations appear in Life Magazine, and on Time Magazine covers. The posters are of a convenient size; will fit wherever there is a 30-inch space.

Another Achievement for

WICKWIRE ROPE!

First manufacturer in all New England to be awarded the Maritime M and Victory Fleet Flag for outstanding production accomplishments.

MAIL THIS COUPON

Wickwire Spencer Steel Company,
500 Fifth Avenue, New York, N. Y.

Send.....free posters, "I Pull with Uncle Sam!"

Name......................................

Company ....

Address....................................

IRVING "SUBWAY" GRATING

TIME IS THE GREAT TESTER

The clothes and automobiles in the above picture have long since worn out and been discarded.

The **Irving Subway Grating** installation, however, has endured under all kinds of weather conditions and the scuffing of millions of shoes—requiring only an occasional painting.

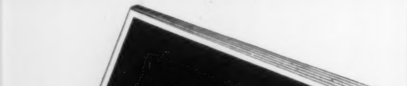
Forty years of specialized experience in the grating field qualifies us to recommend—

"*A Fitting Grating for Every Purpose*"

IRVING SUBWAY GRATING CO., INC.
5008 27th Street
LONG ISLAND CITY, NEW YORK

"COMMERCIAL" METHODS

of tunneling—described in our booklet—every engineer interested in tunnel design should have it—Drop us a card.



THE COMMERCIAL SHEARING AND STAMPING CO.
YOUNGSTOWN, OHIO

ment at Columbus—point of heaviest pollution of Scioto.

Water Pollution, Virginia. Study of Stream Pollution Problem in Roanoke, Virginia, Metropolitan District. *Virginia Polytechnic Inst.—Bul., Eng. Experiment Station Series No. 51*, vol. 35, no. 10, May 1942, 120 pp. Results of survey reported in two parts as follows: Part I: Physical and Chemical Tests of Waters; Sanitary Bacteriological Examination of Waters; Plankton of Waters and Muds, by P. H. McGauhey and H. F. Eich. Part II: Microscopic Invertebrate and Vertebrate Faunae; Toxicity of Viscose Wastes to Fishes, by H. W. Jackson and C. Henderson.

STRUCTURAL ENGINEERING

Framed Structures, Steel. A-Frames Aid Erection of 300-Ft Trusses. *Eng. News-Rec.*, vol. 129, no. 5, July 30, 1942, pp. 150–152. Based on experience with 300-ft roof truss spans in other plants, timber A-frames were used for steel erection on recent war factory in highly effective manner; trusses were designed with cantilever overhang to prevent stress transfer; suspended trusses are 172 ft long; close timing on erection schedules simplified handling 12,000 tons of steel.

Wind Tunnels, Dayton, Ohio. Big American Wind Tunnel. *Mech. World*, vol. 112, no. 2898, July 17, 1942, p. 51. Description of 20-ft wind tunnel at Wright Field, Dayton, Ohio, which supplements two existing tunnels—one of 5-ft and other of 14-in. jet diameter. Made of 700 tons of sheet and structural steel, tunnel is closed tube of circular cross section, varying in diameter from maximum of 45 ft to minimum of 20 ft at testings section; total circuit length at center line of tunnel is 616 ft; airplane models of 15-ft span can be tested in tunnel.

TUNNELS

Construction. Further Notes on Tunneling Practice, R. Hammond. *Engineer*, vol. 173, no 4510, June 19, 1942, pp. 509–511. Illustrated description of excavating and timbering methods which should be employed for tunneling deep underground; example given of double-track railway tunnel driven through variable ground, predominant rock being of metamorphic type; general outline of English system of timbering as applied to large tunnel section. See also *Engineering Index* 1941, p. 1248.

Railroad Signals and Signaling. Intermediate Signaling in Severn Tunnel. *Ry. Gaz.*, vol. 76, no. 25, June 19, 1942, pp. 672–673. Details of signaling installed in Severn Tunnel, Great Western Railroad, to improve operation of heavy traffic; tunnel is 4 m, 628 yd long; operating and signaling problems; advance section signaling; control circuits; operating rules; general arrangements of signaling shown in diagram.

Water Supply, Concrete Lining. Concreting Eighty-Five Miles of Pressure Tunnel, H. R. Bouton. *Water Works Eng.*, vol. 95, no. 12, June 17, 1942, pp. 666–669, 699, and 710–713. General details of outstanding features of Delaware Aqueduct; description of methods pursued in placing tunnel lining and related operations, rigid requirements for concrete construction, and few of largest structures for control and treatment of water.

WATER PIPE LINES

Valves. Valves Set 200 Feet or More Below Ground Surface. *Water Works Eng.*, vol. 95, no. 5, Mar. 11, 1942, pp. 244 and 270–271. Bronze riser valves placed below rock floor for emergency shut off of flow from New York's Delaware Tunnel.

WATER RESOURCES

Baltimore, Md. Report to Public Improvement Commission of City of Baltimore on Future Sources of Water Supply, G. J. Requardt and A. Wolman. Baltimore, Md., Jan. 28, 1942, 46 pp., tables, maps. Recommendations for securing adequate future water supply by construction of emergency water supply from Patapsco River at Avalon at cost of $4,000,000, when depletion of Gunpowder Falls storage has reached danger point and when restrictions on use have failed to guarantee safety to city.

WATER TREATMENT

Algae Control. Copper Sulfate Test for Algae Control, W. D. Monie. *Water Works Eng.*, vol. 95, no. 10, May 20, 1942, pp. 512–515. Discussion of important factors in control of algae with copper sulfate; report of tests conducted to determine correct amount of copper sulfate to apply when treating for algae control. Bibliography.

Filtration Plants. Filtration Practice Evolution in Great Lakes Area, L. R. Howson. *Water Works Eng.*, vol. 95, no. 12, June 17, 1942, pp. 646–649 and 707–708. Development of filters and plant practices during past 30 years; Niagara Falls plant, first to filter Great Lakes water, is described along with other Great Lakes plants; features of equipment are discussed.

Filtration Plants, Nashville, Tenn. Filter Plant Results at Nashville, N. N. Wolpert. *Water Works Eng.*, vol. 95, no. 12, June 17, 1942, pp. 661–665 and 700. Filter plant operation shows that it costs $8.50 to produce one mg of treated water; details of operating conditions are given in tables which list condition of river or raw water as it enters filter plant, summary of chemicals applied to treat water; characteristics of water before and after treatment.

Military Camps, Water Supply. Behind Military Line, N. N. Wolpert. *Water Works Eng.*, vol. 95, no. 9, May 6, 1942, pp. 458–461 Description of extensive laboratory facilities available at Fort McPherson, Ga., to check on supplies in Southeastern area.

Water Chlorination. New Method for Control of Breakpoint, H. L. Keinath. *Water Works Eng.*, vol. 95, no. 5, Mar. 11, 1942, pp 236–237. Details of procedure based upon fading quality of methyl orange-xylene cyanole as chlorine indicator.

WATER WORKS ENGINEERING

Air Raid Precautions. Guards Increased at Los Angeles, W. W. Hurlbut. *Water Works Eng.*, vol. 95, no. 12, June 17, 1942, pp. 692 and 710. How properties of department of water and power are guarded under war conditions.

Air Raid Precautions. Water Supply Protection Plans. *Water Works Eng.*, vol. 95, no 12, June 17, 1942, pp. 691 and 708–709. Present development of protection plans for one Pacific Coast and two Atlantic Coast states is outlined.

Oak Harbor, Ohio. Purchased Supply Is Cheapest, H. E. Peters. *Water Works Eng.*, vol 95, no. 11, June 3, 1942, pp. 572–573. Due to excess hardness of local water supply at Village of Oak Harbor, Ohio, town made agreement to purchase water from Port Clinton, 11 miles away; details of construction of steel transmission main 11 miles long, booster station, 100,000-gal elevated tank, and additional mains in village.

Ogden, Utah. Wells Under Reservoir Supply City, H. F. Irwin. *Water Works Eng.*, vol. 95, no. 3, Feb. 11, 1942, pp. 135–136. Water supply of Odgen comes from 47 artesian wells which are covered by man-made reservoir; wells connected to large collecting mains which empty into collecting basin; details of distributing system, consumption, and water rates.

Protection. Operation of Distribution Systems Under Bombing Conditions, R. Bennett. *Water Works & Sewerage*, vol. 89, no. 6, June 1942, pp. 261–265. Summary and conclusions based principally on English experience; discussion of sterilization, chlorine equipment and supplies, portable equipment, emergency chlorination; pollution, fire protection, procedure following bombing, maintenance of water service, stand-by power and equipment, emergency crews, records and maps, and hydrants.

Wartime. Evidence Presented that American Cities Can Take It When Mains Are Subjected to Wartime Bombing Conditions, K. J. Carl. *Water Works Eng.*, vol. 95, no. 10, May 20, 1942, pp. 516–519. Data from National Board of Fire Underwriters records on water supply systems of over 450 cities in United States and comparison with supply systems in England; conclusions reached that due to strength of our distribution systems, designed for substantial fire flows, and adequate number and proper distribution of gate valves and hydrants, American water systems can provide for civilian defense.

Wartime. Guarding New York's Supply, E. Nuebling. *Water Works Eng.*, vol. 95, no. 12, June 17, 1942, pp. 640–645 and 704–707. Outline of plans for protection of water supply structures of New York City against sabotage and enemy attack.

Wartime. Should Bombs Come. *Water Works Eng.*, vol. 95, no. 6, Mar. 25, 1942, pp 298–303. Details and descriptive notes on equipment and materials available for meeting conditions brought about by explosions of bombs.

Wartime. Unifying Water-Works Defense. *American City*, vol. 57, no. 7, July 1942, pp. 61–62. Cooperative plan by Office of Civilian Defense for mutual aid of water works.

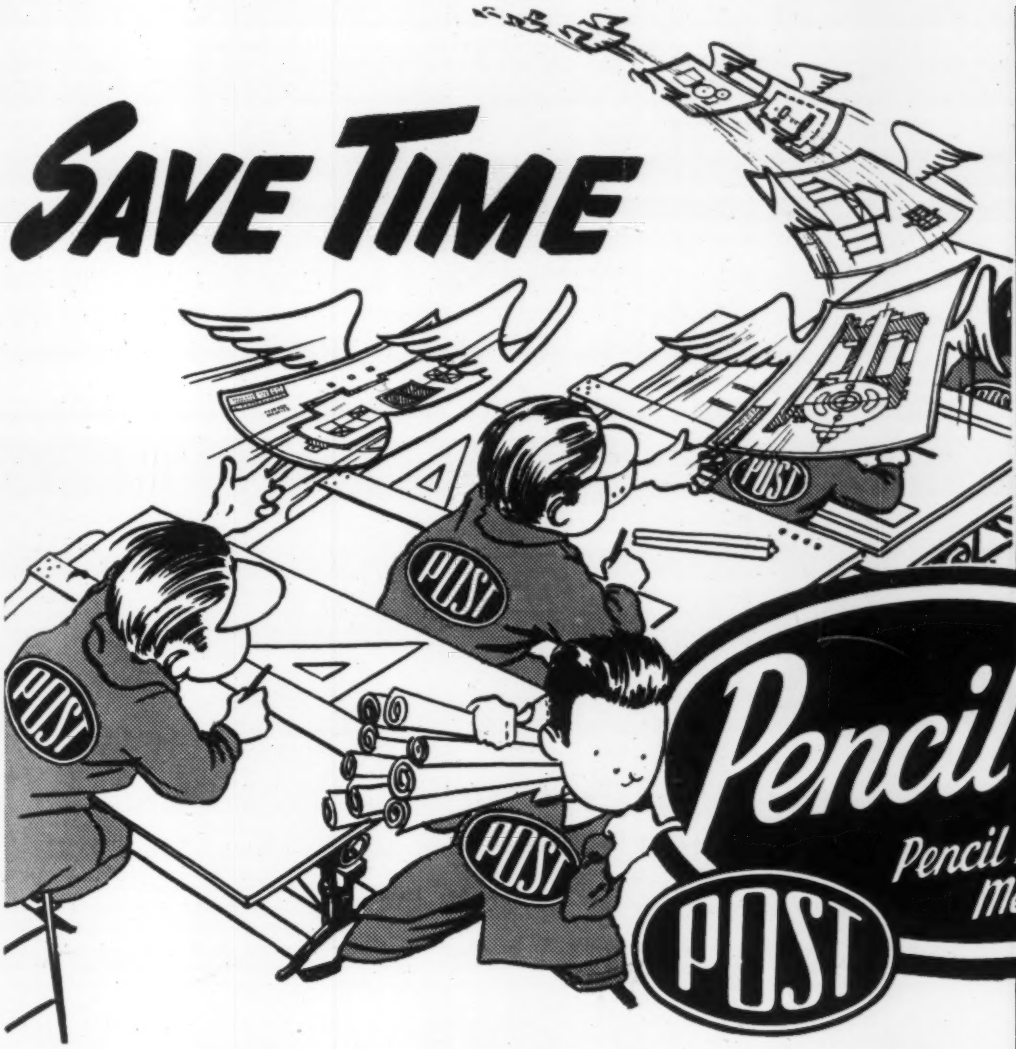
Waste Surveys. New "Philadelphia Story," M. J. McLaughlin. *Water Works & Sewerage*, vol. 89, no. 6, June 1942, pp. 245–247. How systematic water waste survey in progress has already saved Philadelphia needed 13,000,000 gal daily to meet defense demands.

Water Wells, Cleaning. Acid Treatment Quadruples Flow in War Plant Water Well. *Eng. News-Rec.*, vol. 129, no. 7, Aug. 13, 1942, pp. 232–234. Details of method of increasing well flow by treatment with hydrochloric acid; acidizing process increased well flow from 166 gpm to 1,000 gpm.

Water Wells, Drilling. Drilling and Developing Deep Wells, J. A. Carr. *Water Works & Sewerage*, vol. 89, no. 6, June 1942, pp. 251–252. Experiences in construction of wells in red sandstone formation encountered in northern New Jersey. Discussion of important points in construction, including full and complete specifications and bid sheet permitting fair comparison of prices; selection of qualified contractor; full size hole that is plump; proper sealing; proper and complete testing.

Water Wells. Open Well Development Method. *Water Works Eng.*, vol. 95, no. 3, Feb. 11, 1942, pp. 137–138. Details of developing well with compressed air by "open well" or "surging" method, using separate drop pipe

SAVE TIME



Pencil·TEX

Pencil Drafting Medium

POST

POST

NATIONWIDE NETWORK OF POST DEALERS

Atlanta—Georgia Blue Print Co.
Birmingham—James A. Head, Inc.
Boston—Boston Blue Print Co.
Buffalo—Buffalo Blue Print Co.
Chicago—Frederick Post Co.
Cincinnati—Queen City Blue Print Co.
Cleveland—The City Blue Printing Co.
Columbus—Franklin Blue Print & Supply Co.
Dallas—The Rush Co.
Dayton—Gem City Blue Print & Supply Co.
Denver—W. H. Kistler Stationery Co.
Detroit—Frederick Post Co.
Fort Wayne—Fort Wayne Blue Print & Supply Co.
Fort Worth—Majestic Reproduction Co.
Houston—Texas Br. Frederick Post Co.
Indianapolis—Indianapolis Blue Print & Litho Co.
Jacksonville—A. R. Cogswell
Kansas City—Western Blue Print Co.
Knoxville—Sehorn & Kennedy
Los Angeles—Stationers Corporation
Memphis—Wray Williams Blue Print Co.
Milwaukee—Frederick Post Co. of Wis.
New Orleans—Southern Blue Print Co.
New York—John R. Cassell Co.
Oklahoma City—The A & E Equipment Co.
Omaha—Standard Blue Print Co.
Philadelphia—Philadelphia Blue Print Co.
Pittsburgh—American Blue Printing Co.
Portland—J. K. Gill Co.
St. Louis—Service Blue Print & Photo Copy Co.
Salt Lake City—Salt Lake Blue Print & Supply Co.
Seattle—Kuker-Ranken, Inc.
Tampa—Office Equipment Company
Toledo—Toledo Blue Print & Paper Co.
Tulsa—Triangle Blue Print & Supply Co.
Washington, D. C.—R. E. MacMichael
Wichita—City Blue Print Co.

TURN OUT BETTER PLANS—QUICKER

Quality plus Speed *both* count these days! And with *Pencil*-TEX — the Post pencil tracing medium with the new s-m-o-o-t-h surface — getting out top-quality drawings in jig-time is no problem. *Pencil*-TEX takes hard pencil lines, coarse or fine, and anchors 'em jet black. Because of its glass-like transparency, and the density of pencil lines on its surface, prints made from *Pencil*-TEX have a razor-keen sharpness, a cleanliness and a clarity that make blue-print readers say: "Why doesn't every drafting room speed up with *Pencil*-TEX?" Remember, *Pencil*-TEX is available in 20-yard rolls of 30, 36 and 42-in. widths. Your best Priority will bring it quickly. Accept today the free offer below.

'43 WEEKLY CALENDER—JUST PHONE!

A Beauty with Indexed Technical Data Charts, FREE WHILE THE SUPPLY LASTS. Ask your "POST" man.

GET YOUR FREE TRIAL NOW

At our expense, prove to yourself the superiority of *Pencil*-TEX. Free trial samples—actual work size sheets—are yours for the asking. At the right is the name of your Post man. 'Phone him for your free trial supply, or send direct to

THE FREDERICK POST CO., BOX 803, CHICAGO

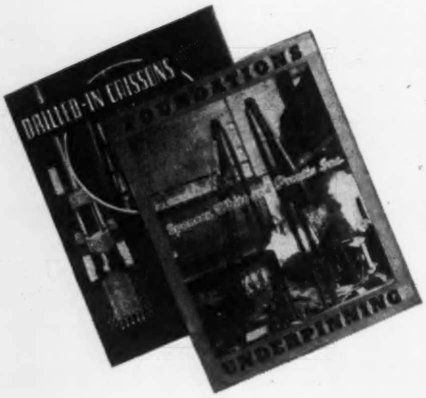
POST

INSTRUMENTS • EQUIPMENT • BLUE PRINT PAPERS • KINDRED SENSITIZED PRODUCTS

JUST PHONE OR WRITE YOUR NEAREST POST MAN

FOUNDATIONS

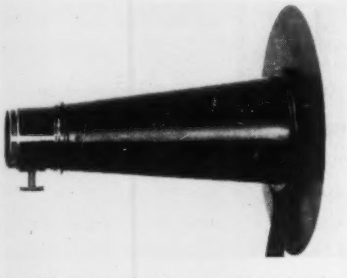
PRETEST UNDERPINNING
CONCRETE-STEEL PILES
MASS CONCRETE CONSTRUCTION
HEAVY SHORING
DRILLED-IN CAISSONS



Send for catalogs descriptive of the latest foundation types and methods.

SPENCER, WHITE & PRENTIS, INC.
10 EAST 40th ST. NEW YORK, N. Y.

The LENS *that assures* PRECISION



For either qualitative or quantitative photo-elastic analysis, perfection in the projection lens system is of major importance.

In our new model polariscopes of 4¼″ & 6¼″ clear aperture, the parallel beam is collected by a rear element and condensed through a three component lens of the Cooke system. In the new larger unites (8¼″ and 10″ aperture) a four component lens of the Omnar system is used. In both cases, *the image is sharp throughout the field, free of aberration, astigmatism, and distortion.*

Literature of new model polariscope now available

POLARIZING INSTRUMENT CO.
630 Fifth Ave., New York, N. Y.

AMERICAN SOCIETY OF CIVIL ENGINEERS FOUNDED 1852

Why do so many ENGINEERS ask for all 24 of the ASCE MANUALS?

These Manuals of Engineering Practice, compiled by men of wide experience and acknowledged authority, contain information useful to the civil engineer in his every-day work. They present facts, briefly and to the point, and should be of value to you. You can get the list of Manuals published to date by mailing the coupon.

American Society of Civil Engineers
33 West 39th Street, New York, N.Y.

Please send, without obligation, complete list of 24 Am. Soc. C.E. Manuals.

Name ....
Address ....
City .... State ....

Equipment and Materials

Big Figure Calendar

WITH DATES AS BIG AS A HOUSE the new Post 1943 Calendar features a weekly pad you can see a mile. The over-all size is 15$^3/_4$ by 24$^1/_2$ in.

POST
Drafting Material
1st WEEK
JAN 1943
Sunday
Monday
Tuesday
Wednesday
3 4 5 6
Thursday
Friday
Saturday
7 8 9

A section of technical data for the engineer and draftsman is included, containing charts on wire and sheet metal gages, screw threads, et cetera. Copies of the calendar may be obtained from Frederick Post Co., Box 803, Chicago, Ill.

Prefab House of Wood

BRINGING TO THE prefrabrication field more than twenty-five years of woodworking experience, three Northwest plywood and door manufacturers have tooled parts of their plants to assembly lines for house sections. The companies are Wheeler-Osgood Sales Corp. and Buffelen Lumber and Mfg. Co., both of Tacoma, Wash., and Harbor Plywood Corp.—Acme Door Co. of Hoquiam, Wash.

Basic material used in this system of shop-fabrication is fir plywood. The stressed-skin principle with plywood glued to both sides of light framework is followed. The new system utilizes large pre-built panels of walls, roof and floor, but light enough to be handled easily by two men. As designed, the house panels can be erected as single or multiple unit dwellings for war workers, or as dormitories or commercial buildings. The structures can be built as permanent buildings or be made demountable.

The one-family home can be erected by two carpenters and a helper in a day and a half. Finished in another day or two, it would be ready for occupancy only four or five days after the ground is cleared for the foundation. Cost complete with the exception of the lot is about $2,200.00 when erected in quantity.

Keep that Extra Margin of Safety!

The extra margin of safety provided by Atlas Manasite Detonators is an advantage at any time . . . but never more so than in these months of all-out production essential to the war effort.

By reducing the chance of mishap through inadvertent mishandling, Atlas Manasite Detonators help to avoid accidents . . . accidents that may cause serious disruptions in man schedules, equipment schedules, and production schedules.

Of course, no detonator is foolproof. But more than 200 million Atlas Manasite Detonators have already been used

—and their extra margin of safety is a big advantage.

Manasite Detonators require no special equipment or change in methods of use. And they cost no more.

Can you afford *not* to use this advance in safer blasting?

MANASITE—Reg. U. S. Pat. Off.

ATLAS MANASITE DETONATORS

for GREATER SAFETY

ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington, Del. · Offices in principal cities · Cable Address—Atpowco

CHECK
CAREFULLY—
MEPHISTO
BLUE PRINT CHECKING PENCILS

Made expressly for checking on blue prints, but will also be found suitable for all other checking requirements.

1340 Brick Red
1341 White
1342 Yellow
1343 Orange
1344 Blue
1345 Brown

SET 01340 contains one each of the six colors and was produced at the request of several of the U. S. Government offices.

KOH-I-NOOR Drawing Pencils produce better blue prints.

FOR VICTORY
BUY
UNITED STATES
WAR
BONDS
AND
STAMPS

Send for free catalog No. 4

KOH-I-NOOR PENCIL COMPANY, INC.
373 Fourth Ave. — New York

BUFF
TRADE MARK TRADE MARK

WORLD FAMOUS FOR 74 YEARS

Transits and Levels for Civil and Mining Engineers

Buff precision and design are continuously in the forefront.

ENGINEERS and contractors know that BUFF performance is accurate and sure—with adjustments that hold permanently.

THE BUFF "X" TELESCOPE

has the finest and highest definition and simplest lens system. It is useful when the light is dim.

Buff is used almost exclusively on the largest works in this country and Canada and Mexico and So. America.

Astronomical lens experts.

All makes—intelligently repaired and regraduated by Factory Experts.

The finest work at the LOWEST POSSIBLE COST. Reliability and guaranteed work. A special Souvenir Plumb Bob sent gratis to graduate Civil Engineers.

THE Greatest ACCURACY
THE Hardest BRONZE
THE Simplest DESIGN

Buff & Buff Company
Jamaica Plain, Massachusetts

INDEX OF PRODUCTS

- Acetylene
  - Air Reduction Sales Co.
- Acetylene Generators
  - Air Reduction Sales Co.
- Aerial Cableways and Tramways
  - American Steel & Wire Co.
  - Wickwire Spencer Steel Co.
- Airport Drainage
  - Lock Joint Pipe Co.
- Aluminum, Structural
  - Aluminum Co. of America
- Anchors for Fenders and Tunnel Forms
  - Richmond Screw Anchor Co., Inc.
- Arc Welding Equipment
  - Lincoln Electric Co.
- Asphalt
  - Standard Oil Co. (Indiana)
  - Texas Co.
- Asphalt Plank Bridge and Industrial Flooring
  - Philip Carey Mfg. Co.
- Barges, Steel
  - American Bridge Co.
- Bars, Aluminum
  - Aluminum Co. of America
- Belting, Metal Conveyor
  - Wickwire Spencer Steel Co.
- Bins, Storage
  - American Bridge Co.
- Blasting Powder and Accessories
  - Atlas Powder Co.
- Blower Pipe, Steel, for Ventilation Purposes
  - Lock Joint Pipe Co.
- Blue Print Papers
  - Frederick Post Co.
- Borings, Test
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Bridges
  - American Bridge Co.
- Bridge Cables
  - American Steel & Wire Co.
- Bridge Floors, Grating
  - Irving Subway Grating Co., Inc.
- Bridge Planks, Mineral Surfaced Asphalt
  - Philip Carey Mfg. Co.
  - Johns-Manville Corp.
- Buildings, Steel
  - American Bridge Co.
- Cables, Electric
  - Lincoln Electric Co.
- Caissons
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Calcium Chloride
  - Solvay Sales Corp.
- Cement, High-Early-Strength Portland
  - Lone Star Cement Corp.
- Cement, Portland
  - Lone Star Cement Corp.
  - Portland Cement Assn.
- Chemical Feeds
  - Permutit Co.
- Chlorine
  - Solvay Sales Co.
- Coagulation Equipment, Floc Formers, Sludge Removers, Settling Tanks
  - Permutit Co.
- Coatings, Anti-Corrosive
  - Bakelite Corp.
- Cold Mix
  - Texas Co.
- Concrete Admixtures
  - Johns-Manville Corp.
- Concrete Forms
  - Douglas Fir Plywood Assn.
- Concrete Form Anchors, Wood or Steel Forms, Light and Heavy Construction
  - Richmond Screw Anchor Co., Inc.
- Concrete Reinforcement
  - American Steel & Wire Co.
  - Wickwire Spencer Steel Co.
- Contractors
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Corrugated Sheets, Aluminum
  - Aluminum Co. of America
- Corrugated Sheets, Asbestos-Cement
  - Johns-Manville Corp.
- Creosoted Piles, Poles, Ties and Timber
  - American Creosoting Co.
- Culverts, Asbestos-Cement
  - Johns-Manville Corp.
- Culverts, Cast Iron
  - Cast Iron Pipe Research Assn.
- Culverts, Reinforced Concrete
  - Lock Joint Pipe Co.
- Cut-Back Asphalt
  - Standard Oil Co. (Indiana)
- Damp-Proof Compounds
  - Philip Carey Mfg. Co.
- Deaerators and Degasifiers
  - Permutit Co.
- Drafting Instruments and Materials
  - Keuffel and Esser Co.
  - Frederick Post Co.
- Drafting Materials
  - Arkwright Finishing Co.
- Drafting Room Furniture
  - Frederick Post Co.
- Drains, Reinforced Concrete
  - Lock Joint Pipe Co.
- Drawing Supplies
  - Keuffel & Esser Co.
  - Koh-I-Noor Pencil Co.
- Dust Cure
  - Texas Co.
- Electric Blasting Supplies
  - Atlas Powder Co.
- Engineers
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Engineering Instruments
  - Keuffel & Esser Co.
- Engineering Tapes and Scales
  - Frederick Post Co.
- Expansion Joints, Asphalt or Cork
  - Johns-Manville Corp.
- Explosives
  - Atlas Powder Co.
- Filler, Asphalt
  - Philip Carey Mfg. Co.
- Flooring, Aluminum
  - Aluminum Co. of America
- Flooring, Asphalt Tile
  - Johns-Manville Corp.
- Flooring, Grating
  - Irving Subway Grating Co., Inc.
- Flux, Welding, Brazing, Etc.
  - Air Reduction Sales Co.
- Form Clamps, Concrete Wall Construction
  - Richmond Screw Anchor Co., Inc.
- Form Ties, Concrete Wall Construction
  - Richmond Screw Anchor Co., Inc.
- Foundations
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Gas Density Indicators and Recorders
  - Permutit Co.
- Gauges, Acetylene, Oxygen
  - Air Reduction Sales Co.
- Generators, Electric
  - Lincoln Electric Co.
- Grating, Steel Flooring
  - Irving Subway Grating Co., Inc.
- Hanging Devices for Concrete Forms
  - Richmond Screw Anchor Co., Inc.
- Heavy Stampings
  - Commercial Shearing & Stamping Co.
- Inks, Waterproof, Pigment, Drawing
  - Keuffel & Esser Co.
- Instruments
  - Buff and Buff Co.
  - Keuffel & Esser Co.
  - Polarizing Instrument Co.
- Iron Removal Equipment
  - Permutit Co.
- Joints, Expansion, Paving
  - Philip Carey Mfg. Co.
- Lettering Guides
  - Keuffel & Esser Co.
- Levels
  - Buff & Buff Co.
  - Keuffel & Esser Co.
- Liners, Tunnel
  - Commercial Shearing & Stamping Co.
- Machinery, Pipe Cutting and Bevelling
  - Air Reduction Sales Co.
- Measuring Tapes
  - Keuffel & Esser Co.
- Metal Connectors for Timber Joints
  - Timber Engineering Co.
- Metal Termite Shields
  - Timber Engineering Co.
- Meters, Electric
  - Lincoln Electric Co.
- Motors, Electric
  - Lincoln Electric Co.
- Nickel and Its Alloys
  - International Nickel Co., Inc.
- Oxygen
  - Air Reduction Sales Co.
- Paint Pigment, Aluminum
  - Aluminum Co. of America

Continued on page 35

INDEX OF PRODUCTS

Continued from page 34

- Paper, Drawing and Tracing
  - Keuffel & Esser Co.
- Paving Materials
  - Lone Star Cement Corp.
  - Portland Cement Assn.
  - Standard Oil Co. (Indiana)
  - Texas Co.
- Pencils
  - Koh-I-Noor Pencil Co.
- Penstocks
  - American Bridge Co.
  - Lock Joint Pipe Co.
- Perforated Metal
  - Wickwire Spencer Steel Co.
- Piles, Concrete
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
- Piles, Creosoted
  - American Creosoting Co.
- Piles, Steel Shell
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Pipe, Asbestos-Cement
  - Johns-Manville Corp.
- Pipe, Cast Iron
  - Cast Iron Pipe Research Assn.
- Pipe, Reinforced Concrete
  - Lock Joint Pipe Co.
- Pipe Coating, Asphalt
  - Standard Oil Co. (Indiana)
  - Texas Co.
- Pipe Fittings, Cast Iron
  - Cast Iron Pipe Research Assn.
- Pipe Wrapping, Asbestos Felt
  - Johns-Manville Corp.
- Plastics
  - Bakelite Corp
- Plastic, Asphalt
  - Philip Carey Mfg. Co.
- Plate Work
  - American Bridge Co.
- Plywood
  - Douglas Fir Plywood Assn.
- Polariscope
  - Polarizing Instrument Co.
- Poles, Creosoted
  - American Creosoting Co.
- Portland Cement
  - Lone Star Cement Corp.
  - Portland Cement Assn.
- Portland Cement, High-Early-Strength
  - Lone Star Cement Corp.
- Powder, Blasting
  - Atlas Powder Co.
- Pumps
  - Layne & Bowler, Inc.
- Regulators, Oxyacetylene
  - Air Reduction Sales Co.
- Reinforcement Fabric
  - American Steel & Wire Co.
  - Wickwire Spencer Steel Co.
- Resins, for Protective Coatings
  - Bakelite Corp.
- Road Oils
  - Standard Oil Co. (Indiana)
  - Texas Co.
- Road Surfacing Materials
  - Standard Oil Co. (Indiana)
  - Texas Co.
- Rods, Wire
  - Wickwire Spencer Steel Co.
- Roofing Asphalt
  - Standard Oil Co. (Indiana)
- Roofing Materials
  - Philip Carey Mfg. Co.
  - Johns-Manville Corp.
  - Texas Co.
- Rope, Wire
  - American Steel & Wire Co.
  - Wickwire Spencer Steel Co.
- Screens, Woven Wire
  - Wickwire Spencer Steel Co.
- Sewer Pipe, Reinforced Concrete
  - Lock Joint Pipe Co.
- Sheathing, Wood
  - Douglas Fir Plywood Assn.
- Sheets, Aluminum
  - Aluminum Co. of America
- Sheets, Asbestos-Cement
  - Johns-Manville Corp.
- Shoring
  - Spencer, White & Prentis, Inc.
- Silica Removal Equipment
  - Permutit Co.
- Soda Ash
  - Solvay Sales Corp.
- Springs, Extension, Compression, Torsion or Flat
  - Wickwire Spencer Steel Co.
- Stacks
  - American Bridge Co.
- Static Control Equipment
  - West Dodd Lightning Conductor Corp.
- Steel Shells
  - MacArthur Concrete Pile Corp.
- Steps, Safety Grating
  - Irving Subway Grating Co., Inc.
- Strands, Wire
  - American Steel & Wire Co.
  - Wickwire Spencer Steel Co.
- Subaqueous Intakes and Outfalls Reinforced Concrete
  - Lock Joint Pipe Co.
- Surveying Instruments
  - Buff and Buff Co.
  - Keuffel & Esser Co.
- Swimming Pool Purification and Recirculation Equipment
  - Permutit Co.
- Tanks
  - American Bridge Co.
- Termite Shields
  - Timber Engineering Co.
- Ties, Creosoted
  - American Creosoting Co.
- Timber, Creosoted
  - American Creosoting Co.
- Timber Joint Connectors
  - Timber Engineering Co.
- Torches, Welding and Cutting
  - Air Reduction Sales Co.
- Towers, Steel
  - American Bridge Co.
- Tracing Cloth
  - Arkwright Finishing Co.
- Tracing Duplications
  - Frederick Post Co.
- Transits
  - Buff and Buff Co.
  - Keuffel & Esser Co.
- Tunnel Liners
  - Commercial Shearing & Stamping Co.
- Turntables
  - American Bridge Co.
- Tying Devices for Concrete Forms
  - Richmond Screw Anchor Co., Inc.
- Underpinning
  - MacArthur Concrete Pile Corp.
  - Raymond Concrete Pile Co.
  - Spencer, White & Prentis, Inc.
- Valves, Multiport, Pilot, Automatic Desludging
  - Permutit Co.
- Water Controllers and Indicators
  - Permutit Co.
- Water, Dealkalization
  - Permutit Co.
- Water, Demineralizing (Removal of Total Solids)
  - Permutit Co.
- Water Filters
  - Permutit Co.
- Water, Fluoride Removal from
  - Permutit Co.
- Water, Neutralization, Control of pH
  - Permutit Co.
- Water Softeners, Zeolite—Pressure and Gravity, Hydrogen Zeolite, Hot and Cold Lime Soda, Cold Lime (Spaulding Precipitator and Spiractor)
  - Permutit Co.
- Water Supply Equipment
  - Layne & Bowler, Inc.
- Water Supply Pipe, Reinforced Concrete
  - Lock Joint Pipe Co.
- Waterproofing Asphalt
  - Standard Oil Co. of (Indiana)
- Waterproofings, Membrane
  - Philip Carey Mfg. Co.
- Welding and Cutting Apparatus
  - Air Reduction Sales Co.
- Welding Machines, Electric Arc
  - Lincoln Electric Co.
- Welding Rods and Wire
  - American Steel & Wire Co.
  - Lincoln Electric Co.
- Well Water Systems
  - Layne & Bowler, Inc.
- Wire, Flat, Round, Square
  - Wickwire Spencer Steel Co.
- Wire and Cables, Electrical
  - American Steel & Wire Co.
- Wire Cloth
  - Wickwire Spencer Steel Co.
- Wire Rope and Strands
  - American Steel & Wire Co.
  - Wickwire Spencer Steel Co.

Alphabetical Index to Advertisers shown on page 36

The Society reserves the privilege of rejecting advertisements inconsistent with its ethical procedure

He pulls nails out of Plywood

so you'll know more about driving them in!

• The nails you use with Douglas Fir Plywood in the future may be unlike the nails you have regularly called for up to now. *First* because war-time restrictions to save metal may have a lasting influence on nail sizes and weights. *Second* because the nail-holding tests now being conducted as part of the Douglas Fir Plywood Association's intensified research program may prove that under various conditions shorter or lighter nails—or nails or fasteners of different designs—are more efficient than those previously specified.

Of course the *complete* answer to this new nailing problem—and to scores of others—has not yet been determined. But by the time Douglas Fir Plywood is again generally available, our research men will be able to tell you how to use it to far better advantage than ever before. Douglas Fir Plywood Association, Tacoma, Washington.

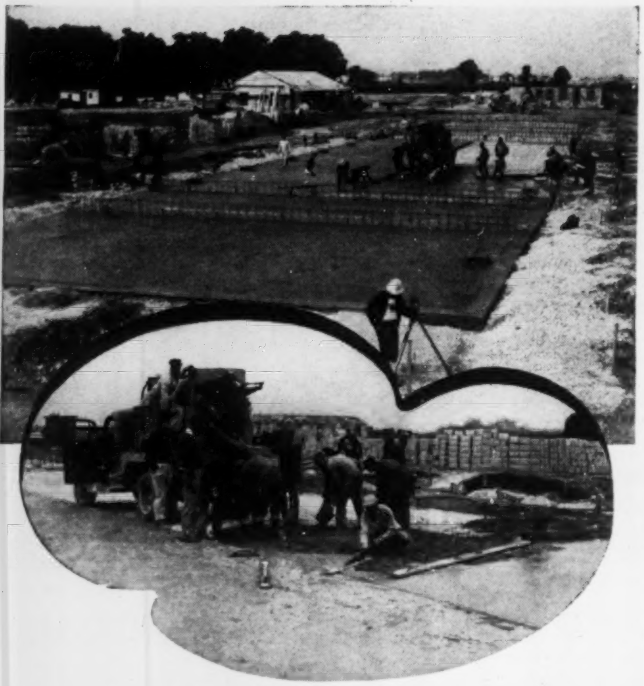
TO HELP SPEED VICTORY the Douglas Fir Plywood Industry is devoting its entire capacity to war production. We know this program has your approval.

REMEMBER—there's a grade or type of Douglas Fir Plywood for every purpose. A genuine panel bears one of these "grade trade-marks":

EXT-DFPA—waterproof type
PLYWALL—wallboard grade
PLYSCORD—sheathing grade
PLYPANEL—cabinet grade
PLYFORM—concrete form grade

DOUGLAS FIR PLYWOOD
Real Lumber
MADE LARGER, LIGHTER
SPLIT-PROOF
STRONGER

"A PRODUCT OF AMERICA'S ETERNALLY REPLENISHING FORESTS"



ORDNANCE PLANT IN OHIO

Concrete floors have the strength to "take it" in arsenals, industrial plants, warehouses, and other places subject to hard wartime usage.

War plants expedited by plain concrete

floors on ground

War plant construction is often aided these days by building floors on ground with concrete. Steel is seldom needed. The bulk of the material is usually available locally, with minimum transportation. Big floor areas can be completed rapidly and used as a working platform for other construction operations.

And after assembly lines start rolling, concrete's strength and durability help maintain the nearly-perfect floor conditions so vital to plant efficiency.

Where a high light-reflection factor is desired to improve lighting conditions, a white portland cement concrete topping is easily provided.

Our technical staff is ready to assist designers and builders on floors and other war construction. The information sheet described below may be helpful in expediting your job and getting maximum service from concrete.

PORTLAND CEMENT ASSOCIATION
Dept. 11-13, 33 W. Grand Ave., Chicago, Ill.

Please send me free information sheets checked:
☐ *"Concrete Floors on Ground,"* covering subgrade, slab design, jointing, placement, finishing, curing.
☐ *"White Cement Floors,"* giving construction data.

Name
Organization
Address
City *State*

INDEX TO ADVERTISERS

and their advertising agencies

AIR REDUCTION SALES COMPANY 3
G. M. Basford Company
ALUMINUM COMPANY OF AMERICA 8
Fuller & Smith & Ross, Inc.
AMERICAN BRIDGE COMPANY 2
(United States Steel Corporation subsidiary)
Batten, Barton, Durstine & Osborn, Inc.
AMERICAN CREOSOTING COMPANY 21
Russell T. Gray, Inc.
AMERICAN STEEL & WIRE COMPANY 12
(United States Steel Corporation subsidiary)
Batten, Barton, Durstine & Osborn, Inc.
ARKWRIGHT FINISHING COMPANY 24
Horton-Noyes Company
ATLAS POWDER COMPANY 33
Aitkin-Kynett Company
BAKELITE CORPORATION . . . . . . 14 and 15
Rickard & Company, Inc.
BUFF & BUFF COMPANY 34
PHILIP CAREY MANUFACTURING COMPANY . . 32
S. C. Baer Company
CAST IRON PIPE RESEARCH ASSOCIATION . . 13
Alley & Richards Company
COMMERCIAL SHEARING & STAMPING COMPANY 28
DOUGLAS FIR PLYWOOD ASSOCIATION 35
McCann-Erickson, Inc.
INTERNATIONAL NICKEL COMPANY, INC. . . . 1
Marschalk & Pratt Company
IRVING SUBWAY GRATING CO., INC. 28
JOHNS-MANVILLE CORPORATION . . . . 6 and 7
J. Walter Thompson Company
KEUFFEL & ESSER COMPANY 4
Doremus & Company
KOH-I-NOOR PENCIL COMPANY 34
Roeding & Arnold, Inc.
LAYNE & BOWLER, INC. 26
O'Callaghan Advertising Agency, Inc.
LINCOLN ELECTRIC COMPANY 19
Griswold-Eshleman Company
LOCK JOINT PIPE COMPANY 17
Needham & Grohmann, Inc.
LONE STAR CEMENT CORPORATION 25
Cowan & Dengler, Inc.
MACARTHUR CONCRETE PILE CORPORATION . 10
G. M. Basford Company
PERMUTIT COMPANY 31
Newell-Emmett Company
POLARIZING INSTRUMENT COMPANY 30
PORTLAND CEMENT ASSOCIATION 36
Roche, Williams & Cunnyngham, Inc.
FREDERICK POST COMPANY 29
Western Advertising Agency, Inc.
RAYMOND CONCRETE PILE COMPANY *Second Cover*
Needham & Grohmann, Inc.
RICHMOND SCREW ANCHOR COMPANY, INC. . . . . *Back Cover*
Walter Ramsay Company
SOLVAY SALES CORPORATION 32
Atherton & Currier, Inc.
SPENCER, WHITE & PRENTIS, INC. 30
STANDARD OIL COMPANY (INDIANA) 23
McCann-Erickson, Inc.
TEXAS COMPANY . . . . *Third Cover*
TIMBER ENGINEERING COMPANY 5
Campbell-Ewald Company
U. S. STEEL CORPORATION SUBSIDIARIES . 2 and 12
Batten, Barton, Durstine & Osborn, Inc.
WICKWIRE SPENCER STEEL COMPANY 27
Fuller & Smith & Ross, Inc.

Index to Products Shown on Pages 34 and 35